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Fertilizer Consumption in 1941 and Trends in Usage

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FERTILIZERS, which are of outstanding importance among the strategic materials of agriculture, are affected in two ways by the circumstances of war. Not only is their use more important in insuring maximum production of food and fiber, but also some of their ingredients are in unusual demand for other war purposes. Wise use of available fertilizers is thus one of the concerns of a wartime mobilization of national resources. Determining such use is in part dependent on an understanding of past consumption and of trends in the use of these materials by American farmers. Surveys of fertilizer consumption in the United States are already available in publications for the calendar years 1917 (*2*)[1] and 1925(*3*, *pp. 35–42*), and for the fiscal years 1933–34 (*8*) and 1938–39 (*7*). The detailed figures now compiled on the kinds and quantities of fertilizers consumed in the calendar year 1941 thus afford not only the most recent data available but also, in comparison with earlier publications, a means for observing trends. Their use is expected to be of value in formulating policies and recommending practices during the immediate future.

FERTILIZER SURVEY FOR 1941

The total consumption of commercial fertilizers in 1941 was about 9,284,000 tons, containing approximately 453,500 tons of nitrogen, 985,200 tons of available phosphoric acid, and 461,000 tons of potash. The total commercial distribution in the continental United States was 8,166,903 tons, of which 6,515,603 tons was used in the spring of 1941 and 1,651,300 tons in the fall. Federal Government agencies distributed 851,649 tons of fertilizers, mostly superphosphates, containing 205,000 tons of available phosphoric acid. Mixed fertilizers constituted 63 percent of the total consumption. The 2–12–6 grade has supplanted the 3–8–5 grade as the most popular in the United States. A minimum of 651 different grades was sold in 1941, but the 12 leading grades account for more than half the tonnage and 75 grades for more than 90 percent. The four materials, normal superphosphate, concentrated superphosphate, nitrate of soda, and sulfate of ammonia, account for more than three-fourths of all sales of separate materials to farmers. The 20 percent superphosphate is increasing very rapidly in importance at the expense of 16 percent goods. The weighted average plant-food content of N-P-K mixtures sold in 1941 was 3.94 percent nitrogen, 9.57 percent available phosphoric acid, and 6.49 percent potash, or a total of 20 percent of the primary plant nutrients.

METHODS OF OBTAINING THE DATA

Grade Survey and Fertilizer Consumption

In general, the methods of obtaining and analyzing data for this report were the same as those described in previous studies (*6*, *7*, and *8*) on fertilizer consumption. In the 1938–39 study, State tonnage reports of sales of fertilizer, by grades, were used for about half the

[1] Italic numbers in parentheses refer to Literature Cited, p. 35.

States. For the rest, special questionnaires were sent to all manufacturers doing business in the respective States. State reports and questionnaires together accounted for more than 90 percent of the estimated total consumption in 1938–39 in detail. In 1941 some State agencies issued fertilizer tonnage reports, by grade, for nearly every State using important quantities of fertilizer. These were used in working out detailed State figures wherever available. In a few cases a report was used for the fiscal year 1940–41 or other period, when no figures were avilable for the calendar year 1941. These cases are indicated by footnotes in the accompanying tables. Estimates were made for Delaware, Tennessee, and most of the Western States, based on fertilizer analyses in the State control bulletins, the tonnages reported in detail in 1938–39, the total consumption in 1941 as published by the National Fertilizer Association, and other information. The results of this study, while more accurate than those given in the earlier reports, are still incomplete.

Work on fertilizer statistics is complicated, because data for fertilizer consumption in noncontiguous territories as well as for Government-distributed fertilizers are given by some sources of information and not by others and because certain fertilizers are covered by the laws of some States and not of others. For example, cottonseed meal and dried manures are considered fertilizers in some States and not in others. Necessarily these materials are included in some calculations and excluded from others. Footnotes to the tables attempt to make clear what was done in each case with respect to such fertilizers in this study. To make it less difficult to read the text, the larger and more detailed tables are given in the Appendix.

Different sources of information had to be used in different phases of the work—in a few cases figures may be found in one table that are slightly different from figures in other tables or that may be deduced from other tables for the same statistics. The best data available for the purpose were used in each calculation, but for some States the best available information for certain purposes was not very satisfactory. Therefore, the figures given in this circular should be considered only as fairly close approximations.

The word "ton" in this work invariably means the short ton.

Statistics on Fertilizer Materials

The total consumption of fertilizer materials was obtained in various ways. Some of the figures were obtained from primary producers; others are United States production statistics adjusted for imports, exports, and change of stocks; and still others were estimated by other methods. For example, castor pomace and tung meal were estimated from the Federal census figures for tonnage of castor beans and tung nuts crushed in the same period, because there is no other known use for these materials. The weight of oil produced was subtracted from the corresponding crush, as also was 5 percent of the remainder, which is the average shrinkage. The tonnage of filler was estimated by the quantity necessary to reduce the plant-food content of the raw materials used to that of the finished fertilizers sold.

Determining Plant-Food Content

Plant nutrients are divided by the Association of Official Agriculture Chemists in its official definitions into primary and secondary plant-food elements. The primary plant nutrients are nitrogen, phosphoric acid, and potash. Only these three are included in this work. Plant food and plant nutrient are here used as synonymous terms, as is customary in fertilizer laws and common usage, though this does not strictly follow the terminology of plant physiology.

Commercial fertilizers usually contain somewhat more of each plant nutrient than is guaranteed or indicated by the grade. This excess, known as the overrun, was used in determining the actual nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O) contents of fertilizers consumed in 1941 by the method described in detail by Mehring and Deming (*6*). Briefly, this method involves averaging the guaranties and analyses given in the State fertilizer control bulletin for all mixtures of a given class sold during the season involved and adding the excess of the average analysis over the average guaranty to the weighted average grade as found from the tons of each grade sold.

Parts of the necessary data for 1941 were unavailable for Arkansas, Idaho, Illinois, Montana, Nebraska, Nevada, North Dakota, South Dakota, Tennessee, Utah, Washington, and Wyoming. In such cases, estimates were made from 1939 tonnage data and analyses published by the nearest States with similar conditions.

FERTILIZER CONSUMPTION

Tonnage, by States and Classes

Consumption of all fertilizers, by States, regions, and classes, is given in table 1. The total consumption of commercial fertilizers in 1941, as developed in this study, is about 9,284,000 tons, or the highest that has ever occurred. This figure is 10 percent higher than that for 1940. Of this 1941 total, 823,598 tons were distributed by the Agricultural Adjustment Administration and 28,051 tons by the Tennessee Valley Authority. The combined consumption in all non-contiguous territories was 265,000 tons. A few hundred tons were used in Alaska and the Virgin Islands; the rest in Hawaii and Puerto Rico.

The total commercial distribution in the continental United States was found in this study to be approximately 8,167,000 tons. The National Fertilizer Association figure, as published (*1*), is 8,402,000 tons. In large part, both results were calculated from the same data. In some cases the National Fertilizer Association used tax-tag sales, where in this survey grade reports were used. Consumption, as indicated by tax-tag sales, is sometimes too high, because tags unused at the end of the year may be redeemed or in some States carried over to later years. Grade surveys when complete are accurate, but if incomplete, consumption as thus given is too low. The actual total consumption is believed to lie between the two figures given above.

TABLE 1.—*Commercial distribution, Government distribution, and total fertilizer consumption (in tons), by States, 1941*

Region and State	Commercial distribution [1]			Government distribution [2]	Total consumption
	As mixed fertilizers	As separate materials	Total		
New England	248,796	69,001	317,797	126,081	443,878
Maine	143,000	9,000	152,000	21,618	173,618
New Hampshire [3]	8,473	4,443	12,916	17,777	30,693
Vermont	9,240	3,305	12,545	62,495	75,040
Massachusetts [3]	46,212	20,027	66,239	13,683	79,922
Rhode Island [3]	9,500	3,000	12,500	2,090	14,590
Connecticut [3]	32,371	29,226	61,597	8,418	70,015
Middle Atlantic	864,883	339,364	1,204,247	140,239	1,344,486
New York	222,511	157,308	379,819	89,879	469,698
New Jersey	164,827	19,564	184,391	0	184,391
Pennsylvania	264,444	111,152	375,596	16,390	391,986
Delaware	30,000	4,500	34,500	29	34,529
Maryland	147,101	24,840	171,941	1,264	173,205
District of Columbia	1,000	1,000	2,000	0	2,000
West Virginia	35,000	21,000	56,000	32,677	88,677
South Atlantic	2,636,627	895,864	3,532,491	117,821	3,650,312
Virginia	300,000	100,000	400,000	58,882	458,882
North Carolina [3]	829,151	202,677	1,031,828	25,557	1,057,385
South Carolina	435,077	241,734	676,811	5,231	682,042
Georgia	560,000	246,326	806,326	27,450	833,776
Florida	512,399	[4] 105,127	617,526	701	618,227
East North Central	845,931	191,621	1,037,552	71,316	1,108,868
Ohio	351,071	41,606	392,677	17,291	409,968
Indiana	240,970	32,416	273,386	7,956	281,342
Illinois	48,031	[5] 81,137	129,168	9,161	[5] 138,329
Michigan	144,153	24,834	168,987	21,038	190,025
Wisconsin	61,706	11,628	73,334	15,870	89,204
West North Central	66,128	59,332	125,460	29,761	155,221
Minnesota	14,167	7,084	21,251	11,207	32,458
Iowa	12,016	5,345	17,361	5,719	23,080
Missouri	35,561	33,039	68,600	9,636	78,236
North Dakota	300	1,800	2,100	0	2,100
South Dakota	50	450	500	0	500
Nebraska	50	1,750	1,800	0	1,800
Kansas	3,984	9,864	13,848	3,199	17,047
South Central	907,549	687,370	1,594,919	340,627	1,935,546
Kentucky	68,319	48,072	116,391	178,863	295,254
Tennessee	93,825	47,636	141,461	94,209	235,670
Alabama [3]	343,900	236,900	580,800	33,757	614,557
Mississippi [3]	130,159	195,361	325,520	8,344	333,864
Arkansas [3]	56,986	[6] 54,762	111,748	17,111	[6] 128,859
Louisiana [3]	102,000	80,000	182,000	4,279	186,279
Oklahoma [3]	5,608	1,813	7,421	192	7,613
Texas [3]	106,752	22,826	129,578	3,872	133,450
Western	118,969	235,468	354,437	25,804	380,241
Montana	500	4,000	4,500	0	4,500
Idaho	100	6,900	7,000	1,758	8,758
Wyoming		1,700	1,700	0	1,700
Colorado	2,700	3,556	6,256	0	6,256
New Mexico	350	3,526	3,876	172	4,048
Arizona	2,078	7,684	9,762	790	10,552
Utah	300	2,500	2,800	3,200	6,000
Nevada	200	300	500	0	500
Washington	10,000	18,000	28,000	10,743	38,743
Oregon	14,732	10,268	25,000	8,937	33,937
California	88,009	177,034	265,043	204	265,247
Noncontiguous Territories	150,000	115,000	265,000	0	265,000
Hawaii	40,000	85,000	125,000	0	125,000
Puerto Rico	110,000	30,000	140,000	0	140,000
Continental United States	5,688,883	2,478,020	8,166,903	851,649	9,018,552
Total United States	5,838,883	2,593,020	8,431,903	851,649	9,283,552

[1] Based on State tonnage reports. The figures in tables 8 and 9 will not check exactly with those in this table, because they were calculated on a different basis.
[2] All separate materials, except 5,170 tons of mixed fertilizers.
[3] Figures for the commercial distribution are for the State fiscal year ended in 1941.
[4] Exclusive of liming materials.
[5] Including 68,290 tons of raw phosphate rock.
[6] Excluding cottonseed meal, because most of the tonnage reported is believed to have been used as stock feed.

Peaks of Consumption

It is well known that the fertilizer business is seasonal in nature, but the details are not so well known. A real need exists under present conditions for more information regarding the kind and quantities of fertilizers that are used in various States at different times of the year.

The peak of fertilizer manufacturing activity in 1941 occurred in April. (See fig. 1.) But while the peak falls about April 15 for the whole country, it varies widely for individual States. The height of the fertilizer shipping seasons was learned by direct inquiry, addressed to a large number of fertilizer companies as well as to the general freight agents of the railroad and steamship companies of most importance in the movement of these materials.

The peak of outgoing fertilizer shipments from mixing plants at some of the largest centers of production normally occurs on about the following dates:

	Season	
	Spring	*Fall*
Boston, Mass.	May 1	[1].
Carteret, N. J.	Apr. 20	Sept. 20.
Philadelphia, Pa.	Apr. 15	Sept. 25.
Baltimore, Md.	Apr. 10	Oct. 1.
Norfolk, Va.	Apr. 5	Oct. 5.
Wilmington, N. C.	Apr. 1	[1].
Charleston, S. C.	Mar. 20	[1].
Savannah, Ga.	Mar. 15	[1].
Tampa, Fla.	Jan. 10	[2].
Cleveland, Ohio	Apr. 25	Sept. 20.
East St. Louis, Ill.	Apr. 15	Sept. 15.
Montgomery, Ala.	Apr. 5	[1].

[1] No distinct fall season.
[2] Heavy fall business, which rises to a peak in January.

SEASONAL CONSUMPTION

The tonnage and proportion of the total fertilizer consumption in the spring and fall seasons are given in table 17 (in Appendix) for States for which data are available. Estimates were made for the other States. The fall season is important in all the States growing winter wheat and other small grains in large quantities and also in Florida and California. In most other localities more than 80 percent of the total consumption occurs in spring.

In the fall of 1941, 75 percent of the total consumption consisted of commercial mixtures and 25 percent of separate materials, chiefly superphosphate. In the spring nitrogenous materials are relatively more important.

MONTHLY CONSUMPTION

Evidence of the volume of fertilizers shipped by months is given by the number of wage earners employed. The totals for the entire industry, as determined by the United States Bureau of Labor Statistics for each month of the 1940–41 fertilizer year, are plotted in figure 1. In interpreting this curve it should be remembered that in summer a part of the employees are retained even though manufacturing and shipments are normally in low volume and that manufacturing late in the fall proceeds faster than shipments. In March and April the tonnage shipped exceeds that manufactured.

Sales of fertilizer tax tags are recorded monthly for 17 States. The figures for 1941 are given in the Appendix as table 18 and are shown graphically in figure 2 for the 17 States as a whole. It is believed

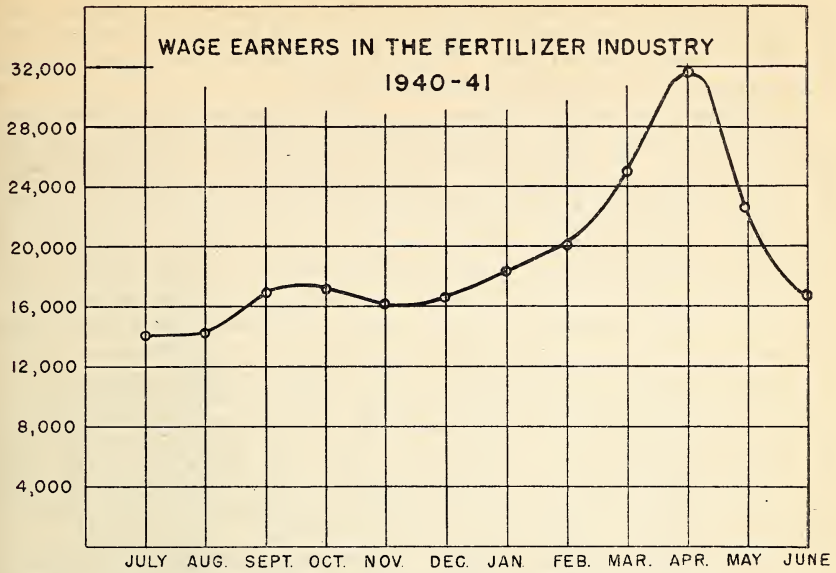

FIGURE 1.—Wage earners in the fertilizer industry, by months, 1940–41.

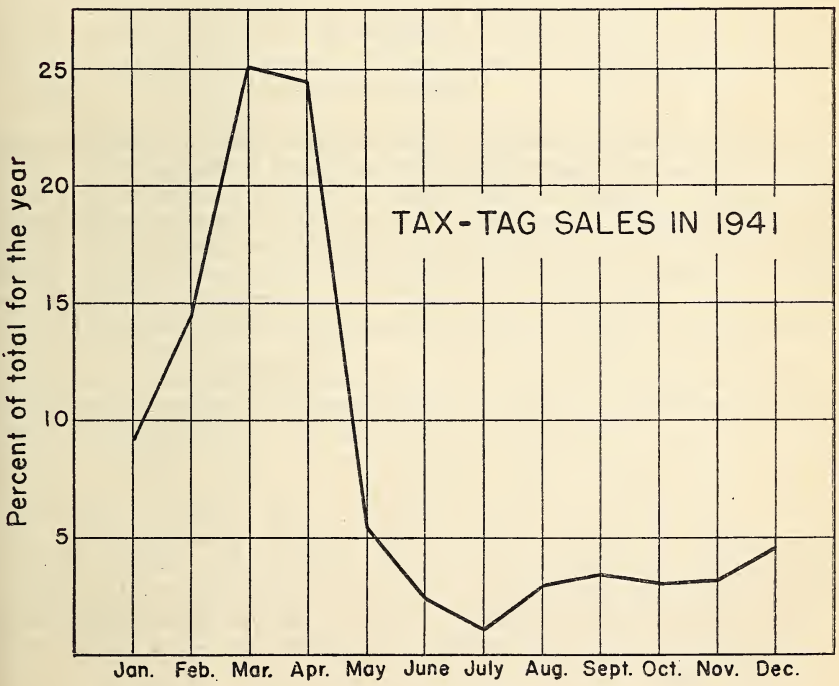

FIGURE 2.—Fertilizer tax-tag sales for 17 States by months, 1941.

that, in general, fertilizer companies buy tax tags as needed and, therefore, these figures give a fair indication of the way shipments are distributed for these States. This is not always true, especially in States where the tonnage is relatively small.

Statistics were recently gathered on the tonnage of all fertilizers shipped by months from nearly all of the fertilizer plants along the Atlantic coast. The results were never published, but the proportions of the annual totals shipped each month are shown in table 19 in the Appendix. This table includes data for several States not shown in table 18. In cases where results are presented for the same State in both tables, distribution, by months, appears to be about the same by either method of determination. A tendency may be noted, however, for the percentage of tax-tag sales to increase more rapidly than shipments in the early part of the season and to fall off more rapidly in the latter part of the season. A few fertilizer tags may be held unused for several years in States where they are good until used, or they may be redeemed without use where they are invalid after the end of the current season. In spite of this, it is believed that the bulk of the fertilizer tags is used on the average within 2 weeks of the time they are bought. The interval between purchase and use is shorter, on the average, in April than in other months.

Some dealers and a few farmers lay in fertilizers well in advance of the need, but normally many farmers order their fertilizer delivered in the field the same day they expect to apply it to the soil, and a large part of this tonnage is delivered directly from the factory.

Trends

TONNAGE

Total fertilizer consumption increased from about 5,500,000 tons in 1910 to a little more than 8,000,000 tons in 1929 and 1930. It then dropped rapidly to 4,333,000 tons in 1932 and has since been increasing gradually again to a new peak of more than 9,000,000 in 1941. The tonnage of fertilizers consumed in each region is shown in table 2 for each decade from 1910 to 1940, as well as for 1941. These figures show that important changes in fertilizer consumption in addition to the total quantity consumed have occurred in the last 30 years.

The New England States used more than 300,000 tons of fertilizer annually as long ago as 1914. In 1940 and 1941 commercial distribution was only a little more than 300,000 tons. From 1912 to 1938, inclusive, the New England region never used less than 4.2 percent of the United States total consumption, and the average was 4.8 percent. In 1941 it used only 3.8 percent of the fertilizers distributed commercially. Owing to the large tonnage distributed by the Agricultural Adjustment Administration, however, New England maintained its position of about 4.8 percent of the United States total.

The Middle Atlantic States have been consuming relatively less fertilizer in recent years than they did 30 years ago, but the difference is unimportant.

TABLE 2.—*Trends in fertilizer consumption,*[1] *by regions, 1910–41*

Region	1910		1920		1930		1940		1941	
	1,000 tons	*Percent*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*
New England	208	3.82	351	4.89	372	4.53	339	4.08	443	4.79
Middle Atlantic	853	15.64	1,017	14.18	1,086	13.22	1,223	14.72	1,339	14.47
East North Central	339	6.22	672	9.36	788	9.60	911	10.96	1,041	11.25
West North Central	34	.62	115	1.60	110	1.33	151	1.82	179	1.93
South Atlantic	3,146	57.70	3,999	55.73	3,857	46.97	3,556	42.79	3,858	41.69
South Central	827	15.17	942	13.13	1,812	22.07	1,825	21.95	2,016	21.79
Western	45	.83	80	1.11	187	2.28	306	3.68	378	4.08
United States	5,452	100.00	7,176	100.00	8,212	100.00	8,311	100.00	9,254	100.00

[1] Includes Government distribution. Data from N. F. A. annual publications.

In the case of the South Atlantic States, fertilizer consumption is relatively much less than formerly—these States used 57.7 percent of the total in 1910 but only 41.7 percent in 1941. This change becomes even more striking when certain States are considered separately. Both Georgia and South Carolina used more than 1,000,000 tons of fertilizer each annually in a number of years between 1910 and 1920, but neither has used that much in any year since 1920. In 1910 and 1911 Georgia and South Carolina each consumed about one-fifth of the United States total. Before 1920 Georgia averaged about 18 percent and South Carolina about 17 percent of the total; from 1921 to 1931, about 11 percent each; and since then, about 9 percent each. The relative consumption in North Carolina increased from 11 percent in 1910 to a maximum of about 17 percent in 1928; since then its relative standing has also receded to 12.8 percent of the total in 1941. On the other hand, Florida consumed 3 percent of the total in 1910, 6 percent in 1930, and 7 percent in 1941.

Fertilizer consumption has increased considerably in the North Central States in recent years. The combined consumption of the Midwest was 373,000 tons in 1910, 898,000 tons in 1930, and 1,220,000 tons in 1941. The East North Central States consumed 11.25 percent of the United States total in 1941, as compared with 6.22 percent in 1910. The corresponding percentages for the West North Central States are 1.93 and 0.62. The trend at present is toward increased consumption in all States in the Midwest.

The South Central States have been increasing their fertilizer consumption at about the same rate as the country as a whole.

Fertilizer consumption in the West was 44,500 tons, or 0.83 percent of the total, in 1910 and has increased steadily to 378,000 tons, or 4.08 percent of the total, in 1941.

CLASSES

The tonnage of each class of fertilizer sold in 1938–39 and in 1941 is listed in table 3. It will be noted from this table that the tonnage of every class of fertilizer increased during this period. Some classes, however, increased proportionately much more than others, so that in 1941 mixed fertilizers were only 60 percent of the total as compared with 70.7 percent in the fiscal year 1939. The principal reason for this was the large quantities of superphosphates and other phosphate

materials distributed by Government agencies in 1941. There was also better coverage of the nitrogenous materials in the present survey as compared with the previous one. For additional data on a State basis, see table 20 in the Appendix.

TABLE 3.—*Tonnage and proportion of different classes of commercial fertilizers consumed in 1938–39 and in 1941* [1]

Class	1938–39		1941	
	Tons	Percentage of total	Tons	Percentage of total
N-P-K mixtures [2]	4,482,138	65.84	4,968,825	55.18
P-K mixtures	253,703	3.73	309,004	3.43
N-K mixtures	34,054	.50	64,463	.72
Customers' and special mixtures	16,789	.25	25,984	.28
N-P mixtures	17,622	.26	19,373	.22
All other mixtures [3]	8,887	.13	11,078	.12
Total mixed goods	4,813,193	70.71	5,398,727	59.95
Chemical nitrogenous	777,551	11.43	1,125,756	12.50
Organics [4]	93,476	1.37	204,959	2.27
Superphosphates (all grades)	747,729	10.98	1,699,584	18.87
Other available phosphates [5]	75,567	1.11	135,551	1.51
Potash materials [6]	126,130	1.85	159,968	1.78
All other materials [7]	173,570	2.55	280,889	3.12
Total materials, as such	1,994,023	29.29	3,606,707	40.05
Total commercial fertilizers	6,807,216	100.00	9,005,434	100.00

[1] Continental United States. Includes fertilizers distributed by Government agencies. Data were unavailable for the commercial distribution in a few States. Thus the totals are less than those in other tables.
[2] So-called complete mixtures containing guaranteed quantities of nitrogen, phosphoric acid, and potash.
[3] One-element mixtures.
[4] Except bonemeal and tobacco stems.
[5] Includes bonemeal and ammonium phosphates.
[6] Includes ashes, tobacco stems, nitrate of soda-potash, etc.
[7] Includes phosphate rock, land plaster, peat, minor-element materials, and also materials unspecified.

MIXED FERTILIZERS

The consumption of mixed fertilizers for the entire United States in 1941 was 5,838,883 tons, or 62.89 percent of the total consumption of all fertilizers (table 1). Eliminating the Government-distributed fertilizers, which consisted almost exclusively of superphosphates, mixed fertilizers constituted 69.25 percent of the total as compared with 71.13 percent in 1939 and 74.12 percent in 1934. The apparent decrease in percentage of mixed fertilizers is probably owing to more complete coverage of material sold separately in the later surveys. In fact, it is believed that no significant change in this respect occurred in 1941 as compared with the previous 5 years, provided the materials distributed by the Government are not included.

More than 700 companies, operating about 1,000 plants, were manufacturing fertilizers in 1941.

Of all the States, Maine consumed the highest proportion of mixed fertilizers. These constituted 94 percent of the total commercial distribution in that State. In Wyoming this figure was less than 0.1 percent. The East North Central region as a whole uses the highest proportion of mixed goods, 81.5 percent; and the West the least, 33.6 percent.

Of the mixed fertilizers sold in 1941, 92 percent were N-P-K, or so-called complete mixtures. As may be seen from table 3, the next mos

important group is the P-K, or so-called alkaline goods, which comprised 5.7 percent of all commercial mixtures. Together they constitute 98 percent of the total. Relatively, the percentage of N-K mixtures has increased considerably, and those of the other classes have remained about the same.

Grades

PRINCIPAL GRADES

A minimum of 651 different grades of mixed fertilizers was sold in the United States in 1941. Of this number 191 were sold in quantities exceeding 1,000 tons. In the present study no individual grades were accounted for in any of the Pacific Coast States. For this and other reasons the total number used in 1941 was probably more than 900. In 1939 and 1934, totals of 982 and 1,053 different grades, respectively, were reported. In none of these surveys were all the grades on the market accounted for, but the trend is undoubtedly toward fewer grades.

A list of the principal grades in the order of their tonnage is given in the Appendix (table 21). The prediction made in connection with the 1939 survey (7) that the 2–12–6 grade would soon be the leading grade has been more than met. The 2–12–6 constituted 3.68 percent of the total tonnage in 1934, 8.62 percent in 1939, and 10.62 percent in 1941. Some other grades that have increased in relative importance since 1939 are 0–12–12, 0–14–6, 0–20–20, 2–10–6, 3–10–6, 3–12–6, 3–12–12, 4–8–6, 4–8–8, 4–10–6, 4–10–7, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 6–8–6, 6–8–8, and 8–16–16. It is significant of the general trend that all these grades have a nutrient content of 18 percent or more. On the other hand, the 3–8–3 grade declined from first place in 1934, with 13.99 percent of the total tonnage, to fifth place in 1941, with only 3.98 percent. The prospects are good that in a few years this grade will be as obsolete as the 2–8–2, which was first in rank in most years before 1920 but only 10 tons of which was reported separately in 1941. Other grades that have decreased in relative importance from 1939 to 1941 are 0–10–4, 0–12–5, 2–8–10, 2–9–5, 2–12–2, 2–12–4, 3–8–5, 3–8–6, 3–9–3, 4–8–3, 4–8–5, 4–8–7, 5–8–7, and 6–6–5.

As in previous surveys, the 12 leading grades account for more than half the total tonnage, and 75 grades for well over 90 percent.

CHIEF REGIONAL GRADES

The 5–8–12 (table 4) has become the leading grade in the New England States. For this reason the 8–16–20 grade has dropped from third to fourth place, but both this grade and the 8–16–16 have grown in importance at the expense of the corresponding single-strength grades. The 4–8–4 mixture has dropped from 5.22 percent of the total to 3.83 percent.

In the Middle Atlantic States the relative standing of the various grades has completely changed. The 2–9–5 has rapidly declined in popularity, whereas the 2–12–6, 3–12–6, 4–8–8, 5–10–5, 5–10–10, and 4–8–12 grades have correspondingly increased in favor.

In the Southern States the 4–8–6 has gained in relative importance,

and the 3–8–3 has declined from 12 to 6 percent of the total for these States.

In the Midwest 2–12–6 continues to be the leading grade, but the 3–18–9, which has the same ratio of plant-food elements, has become relatively more important. The 2–12–2, which at one time was the leading grade in this region, appears to be on the way out.

LEADING STATE GRADES

For the tonnage and relative standing of the principal grades, by States, see table 22 in the Appendix.

TABLE 4.—*Principal grades of mixed fertilizers consumed in certain regions of the United States*

Fertilizer grade	Rank		Tonnage		Percentage of total mixed fertilizers	
	1941	1938–39	1941	1938–39	1941	1938–39
NEW ENGLAND STATES						
5–8–12	1	4	28,206	18,235	11.34	8.99
5–8–7	2	1	27,793	25,520	11.17	12.59
5–8–10	3	2	26,959	23,383	10.84	11.53
8–16–20	4	3	25,088	19,652	10.08	9.69
4–8–10	5	5	15,503	13,084	6.23	6.45
8–16–16	6	7	12,503	9,059	5.03	4.47
4–8–4	7	6	9,518	10,577	3.83	5.22
8–16–14	8	8	7,544	6,086	3.03	3.00
5–10–10	9	(1)	7,500	3,675	3.01	1.81
6–3–6	10	(1)	5,797	4,028	2.33	1.99
10 principal grades			166,411	133,299	66.89	65.74
MIDDLE ATLANTIC STATES						
2–12–6	1	2	98,628	55,286	11.40	7.02
3–12–6	2	5	82,167	51,509	9.50	6.54
4–8–8	3	8	71,098	41,018	8.22	5.21
5–10–5	4	7	58,960	43,494	6.82	5.52
2–9–5	5	1	49,873	87,819	5.77	11.15
2–8–10	6	6	38,024	44,928	4.40	5.70
5–10–10	7	(1)	33,569	12,003	3.88	1.52
4–8–10	8	9	27,951	34,805	3.23	4.42
4–12–4	9	12	26,239	26,618	3.03	3.38
4–8–12	10	(1)	24,602	12,500	2.84	1.59
10 principal grades			511,111	409,980	59.09	52.05
SOUTHERN STATES						
4–8–4	1	2	451,747	384,873	13.00	12.76
3–8–5	2	1	440,359	441,150	12.67	14.63
4–8–6	3	5	232,817	119,492	6.70	3.96
3–8–3	4	3	214,912	366,438	6.18	12.15
5–7–5	5	6	160,888	118,580	4.63	3.93
6–8–4	6	4	156,405	151,939	4.50	5.04
2–10–4	7	(1)	90,991	43,009	2.62	1.43
3–10–6	8	8	90,535	76,261	2.60	2.53
3–8–8	9	10	81,681	67,088	2.35	2.22
2–10–6	10	(1)	78,564	43,079	2.26	1.43
10 principal grades			1,998,899	1,811,909	57.51	60.08
MIDWESTERN STATES						
2–12–6	1	1	421,356	348,814	42.98	47.93
0–12–12	2	4	56,596	21,935	5.77	3.01
3–12–12	3	6	40,243	18,525	4.10	2.55
0–14–6	4	2	37,093	37,491	3.78	5.15
3–18–9	5	(1)	20,668	9,795	2.11	1.35
3–8–6	6	5	18,522	18,957	1.89	2.60
2–16–8	7	8	17,521	13,051	1.79	1.79
0–20–20	8	(1)	17,393	8,880	1.77	1.22
2–12–2	9	3	16,453	36,556	1.68	5.02
2–8–16	10	9	16,386	12,720	1.67	1.75
10 principal grades			662,231	526,724	67.54	72.37

[1] Not determined, but higher than 10.

In the case of 31 States, or 91 percent of the 34 for which details are available (table 22), half the tonnage is accounted for by 5 grades or less; and in 20, or two-thirds of them, by 3 grades or less, although more than 50 different grades were sold in a majority of these States in 1941. More than 100 different grades were sold in 11 of them. Of the States consuming fairly large tonnages of fertilizers, Mississippi had the least number of grades—12; and Florida the most (more than 300), but it is known that not all of the Florida grades were reported. The exact number actually sold in Florida in 1941 is probably closer to 600 than 300.

The manufacture and distribution of so many grades is uneconomical, confusing to the farmer, and serves no useful purpose. A variety of grades should be provided for different soil, crop, and climatic conditions, but it is thought that even in the largest States with the most diverse conditions 30 well-chosen grades will adequately meet all needs.

Trends

Until about 20 years ago, nearly all the tonnage of mixed fertilizers consisted of grades containing less than a total of 14 percent plant nutrients. In 1941 only 0.04 percent consisted of such grades. For a number of years a strong trend has existed toward grades with a total plant-food content of 20 to 26 percent. This is shown by table 5 and figure 3. Present indications are that this trend will continue with increasing force in the near future.

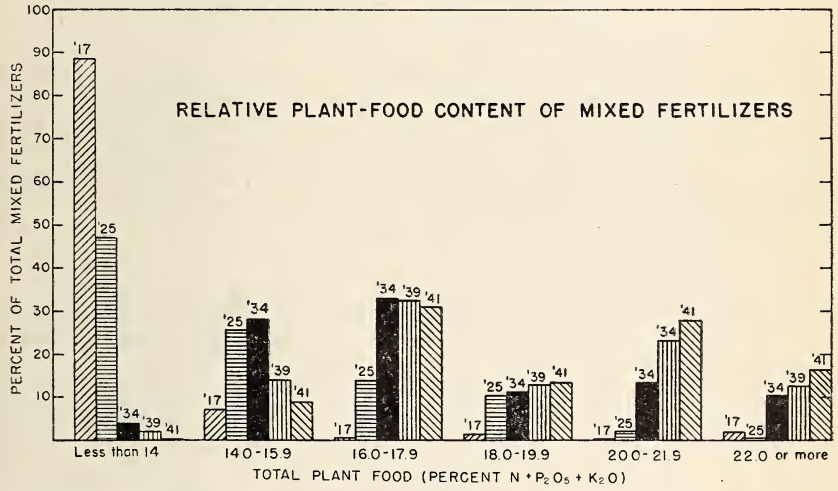

Figure 3.—Proportions of mixed fertilizers falling into specified total plant-food groups, by years.

Of the groups given in table 5, it appears highly probable that the 20.0–21.9 group will become the modal class within a very short time.

TABLE 5.—*Percentages of mixed fertilizers grouped according to the total plant food guaranteed, for certain years, 1917–41*

Year	Total plant food ($N+P_2O_5+K_2O$)							
	<14	14.0–15.9	16.0–17.9	18.0–19.9	20.0–21.9	22.0–29.9	30.0–39.9	40.0+
1917	88.77	7.11	0.53	1.41	0.27	1.33	0.52	0.05
1925	47.22	25.79	13.79	10.21	2.30	.51	.17	.01
1933–34	3.94	28.30	32.70	11.13	13.49	7.64	1.89	.91
1938–39	2.09	14.00	32.47	15.58	23.16	8.51	2.62	1.57
1941	.04	8.86	30.88	16.16	27.67	11.14	3.35	1.90

The average grade of mixed fertilizer consumed in 1941 was 3.63–9.42–6.30, as compared with 3.56–9.24–5.94 in 1939 and 3.40–8.82–5.20 in 1934. The average total plant-food content guaranteed in mixed fertilizers has changed as follows:

Year:	*Total plant food guaranteed*	Year:	*Total plant food guaranteed*
1910	13.8	1936	17.8
1915	13.6	1937	18.1
1920	13.1	1938	18.4
1925	15.5	1939	18.7
1930	17.1	1940	19.0
1935	17.5	1941	19.4

The present trend in usage of mixed fertilizers is strongly toward fewer grades of higher analysis.

FERTILIZER MATERIALS

The total consumption of each fertilizer material is shown in table 6. The total of all materials in this table is about 320,000 tons more than the corresponding total in table 1, but this table contains considerable tonnages of some materials, as raw phosphate rock, tobacco stems, and cottonseed meal, that are only partly covered in the figures in table 1, because of differences in the laws of certain States. The sources of information for constructing table 6 are different from those used in making table 1.

About 100,000 tons more materials are shown in table 6 as having been used to make mixed fertilizers than the total of mixed fertilizers consumed as shown in table 1. As pointed out before, there is reason to believe that several of the State tonnage reports used in constructing table 1 were not complete. Possibly a part of the difference is explained by the fact that some companies produced more mixed fertilizers than they sold during the calendar year 1941.

TABLE 6.—*Fertilizer materials according to use consumed (in tons) in the United States, 1941*

Rank	Material	Continental United States			Non-contiguous territories	Grand total
		Mixed	As such	Total		
1	Normal superphosphate [1]	2,487,000	1,533,000	4,020,000	28,000	4,048,000
2	Nitrate of soda	69,000	789,000	858,000	22,000	880,000
3	Sulfate of ammonia	354,000	177,000	531,000	139,000	670,000
4	Muriate of potash [2]	522,000	80,000	602,000	38,000	640,000
5	Dolomite and limestone [3]	301,650	74,000	375,650	-------	375,650
6	Concentrated superphosphate [4]	95,000	167,000	262,000	200	262,200
7	Phosphate rock [5]	35,147	160,380	195,527	-------	195,527
8	Ammonia and solutions	186,000	7,000	193,000	-------	193,000
9	Sewage sludge (all kinds)	144,000	16,000	160,000	-------	160,000
10	Cottonseed meal [6]	13,000	137,000	150,000	-------	150,000
11	Wet-mixed base goods	130,000	0	130,000	-------	130,000
12	Cyanamid	33,000	83,000	116,000	4,000	120,000
13	Manure salts and kainit [7]	90,000	21,000	111,000	-------	111,000
14	Tobacco stems	80,000	20,000	100,000	-------	100,000
15	Process tankage	89,000	3,000	92,000	-------	92,000
16	Castor pomace	77,000	12,000	89,000	-------	89,000
17	Land plaster [8]	70,000	14,000	84,000	-------	84,000
18	Sulfate of potash and of potash-magnesia	59,000	5,000	64,000	6,000	70,000
19	Basic slag [9]	5,000	60,000	65,000	-------	65,000
20	Ammonium phosphates [10]	22,000	28,000	50,000	13,000	63,000
21	Peanut-hull meal	50,000	0	50,000	-------	50,000
22	Uramon, urea, calurea, etc	31,000	6,000	37,000	4,000	41,000
23	Nitrate of soda-potash	9,000	16,000	25,000	14,000	39,000
24	Dried fish scrap	30,000	7,000	37,000	1,000	38,000
25	Bonemeal	10,000	26,000	36,000	1,000	37,000
26	Peat	30,000	5,000	35,000	-------	35,000
27	Cocoa byproducts	30,000	2,000	32,000	-------	32,000
28	Miscellaneous natural organics [11]	4,000	21,000	25,000	3,000	28,000
29	Miscellaneous potash materials [12]	7,000	17,000	24,000	-------	24,000
30	Dried animal manures	10,000	12,000	22,000	-------	22,000
31	Miscellaneous chemical nitrogenous [13]	9,000	9,000	18,000	2,000	20,000
32	Garbage tankage	14,500	500	15,000	-------	15,000
33	Guanos	14,500	500	15,000	-------	15,000
34	Miscellaneous seed meals [14]	10,000	3,000	13,000	-------	13,000
35	Acidulated fish	11,000	0	11,000	-------	11,000
36	Miscellaneous materials [15]	4,500	5,500	10,000	1,000	11,000
37	Calcium metaphosphate [16]	0	8,949	8,949	-------	8,949
38	Manganese sulfate	8,000	500	8,500	-------	8,500
39	Tung meal	3,000	3,000	6,000	-------	6,000
40	Miscellaneous phosphatic materials	-------	4,000	4,000	-------	4,000
41	Sand and other filler	650,000	-------	650,000	500	650,500
	Total [17]	5,797,297	3,533,329	9,330,626	276,700	9,607,326

[1] Grades containing 14 to 24 percent available P_2O_5. Includes 728,320 tons distributed as such by the A. A. A.

[2] Of that consumed as such, 48 percent was 50 percent grade.

[3] Used as fertilizer filler or sold as such by the fertilizer industry. In addition, more than 15,000,000 tons sold by the lime or other industries was consumed in agriculture in 1941.

[4] Grades containing 30 to 48 percent available P_2O_5. Includes 95,280 tons distributed as such by the A. A. A. and 18,353 tons distributed by the T. V. A.

[5] Includes 5,953 tons distributed as such in Illinois by the A. A. A.

[6] Includes 110,640 tons of meal used as fertilizer on cotton farms and more than 10,000 tons of cottonseed meal denatured with castor pomace.

[7] Includes 19,204 tons of 20 percent kainit consumed as such.

[8] Material handled by the fertilizer industry only. In addition, 130,000 tons distributed by other industries was consumed as such in agriculture in 1941.

[9] Mostly open-hearth basic slag, of which 42,682 tons was distributed by the A. A. A.

[10] About ¾ of the total consumed as such was the 16–20 grade.

[11] Dried blood; shrimp, blue crab, and king crab scrap; hoof and horn meal; etc.

[12] Vegetable potash, cement-kiln dust, lime-potash, wood ashes, cotton-hull ashes, etc.

[13] Calnitro, calcium nitrate, ammonium nitrate, etc.

[14] Linseed, soybean, peanut, apricot-seed, hemp-seed, sesame-seed meals, etc.

[15] Copper sulfate, zinc sulfate, borax, sulfur, and unsegregated.

[16] All distributed by the T. V. A.

[17] Figures for all States and Territories are included.

Changes in Mixed Goods

The total nutrient content of the materials shown in table 6, as having been consumed in making commercial mixtures in the continental United States, was calculated from their average composition. Thus, it was learned that they contained 220,000 tons of nitrogen, 564,000 tons of available phosphoric acid, and 374,000 tons of potash. These quantities correspond to an average plant-food content of 3.79–9.73–6.46. The average grade, as determined from the State tonnage by grade reports, is 3.63–9.42–6.30. When the average overruns are added to the latter figures they become 3.67–9.77–6.60, which check reasonably well with the averages determined from the materials used. If the 650,000 tons of sand had been left out, the materials used would have produced mixed fertilizers with an average content of 4.27–10.96–7.27 percent, respectively, of the three primary plant nutrients. This is a total of 2.5 percent more plant food than they actually did contain.

The kinds of materials used to make mixed fertilizers have been changing in their relative importance for years, as may be seen from table 7. In 1900 more than 90 percent of the nitrogen was derived

Table 7.—*Sources of plant food in commercially mixed fertilizers, 1900–41 (percentage of total)*

Year	Nitrogen				Phosphoric acid			Potash		
	Ammonia and its salts	Nitrates	Natural organics	Organic chemicals	Normal superphosphate	Concentrated phosphates [1]	All other	High-grade salts [2]	Kainit and manure salts [3]	All other
1900	2.1	6.9	91.1		79.8		20.2	71.3	19.6	9.1
1909	16.1	16.2	67.7		80.1		19.9	47.9	44.6	7.5
1913	24.0	19.6	54.3	2.1	78.7		21.3	51.2	39.5	9.3
1919	23.8	19.7	53.6	2.9	81.9	1.7	16.4	54.6	7.8	37.6
1925	29.5	23.1	37.0	10.4	87.7	5.2	7.1	52.6	40.1	7.3
1929	48.2	19.0	22.2	10.6	87.4	5.1	7.5	54.3	38.5	7.2
1935	53.0	18.3	21.9	6.8	86.6	7.5	5.9	77.5	6.1	16.4
1939	58.2	15.6	15.2	10.9	85.4	10.0	4.6	90.8	3.3	5.9
1941	59.0	11.5	15.9	13.7	87.5	9.1	3.4	91.5	6.0	2.5

[1] Concentrated superphosphate and ammonium phosphates.
[2] Muriate and sulfate.
[3] Before 1919 most of this was 12 and 14 percent kainit; from 1925 to 1935, inclusive, most of it was 20 percent salt; and since then it has averaged about 25 percent salt.

from natural organics. In the last few years only about 15 percent came from such materials. The proportions of nitrogen derived from ammonia and its salts and from chemical organics have been increasing for years. The proportion from nitrates increased greatly from 1900 until about 1925, but since then this has been decreasing steadily.

During the past 40 years the percentage of available phosphoric acid in mixed goods that was derived from normal superphosphate has gradually increased from about 80 to 87 percent. The proportions derived from tankage, bonemeal, fish scrap, and like materials have been decreasing, and the quantities derived from double superphosphate and ammonium phosphate have been increasing.

Since 1930 there has been a strong trend toward higher analysis potash salts. Until that time the high-grade salts consisted of 45 to 50 percent sulfate and muriate, and now most of this material consists of 60 percent muriate. In most of the years from 1900 to 1914, from one-third to one-half of the potash in mixed fertilizers came from kainit, running from 12 to 14 percent potash. In 1941 the lowest grade potash salt available contained 22 percent K_2O. The drop in all other sources of potash was due to decreased supplies of nitrate of soda-potash, sulfate of potash-magnesia, and similar materials, which could not be imported so freely as before the war, if at all.

Consumption as Separate Materials

Of the materials consumed in agriculture as such (table 8), normal superphosphate constituted 42.49 percent of the total; nitrate of soda, 21.89 percent, sulfate of ammonia, 6.58 percent; concentrated superphosphate, 4.63 percent; raw rock phosphate, 4.45 percent; cottonseed meal, 3.79 percent; cyanamid, 2.31 percent; muriate of potash, 2.22 percent; and 50 or more other materials combined, 11.64 percent. The first four materials mentioned were reported sold in all except a few of the Rocky Mountain States. Other materials were used in relatively large quantities in some sections of the country—as cyanamid in the Mississippi Delta and cottonseed meal in the Southern States—but in minor quantities, if at all, in other sections. Table 8 gives the consumption, by States, of the more important materials as such in agriculture. It should be kept in mind that the figures in tables 6 and 8 were obtained from entirely different sources and cannot be expected to check exactly; table 6 is based on production, adjusted for exports, imports, and manufacturers' reports, etc., whereas table 8 is based on State consumption reports.

Nitrogenous Materials

The quantities of nitrogenous materials used in making mixed fertilizers in 1941 are given in table 6 and the trends in usage for this purpose in table 7.

550565—43——3

TABLE 8.—*Principal fertilizer materials consumed as such (in tons), by States, 1941*

Region and State	Nitrate of soda	Sulfate of ammonia	Cyanamid	Other chemical nitrogenous material [1]	Dried manures	Tankage	Cottonseed meal [2]	Other organic ammoniates [3]	14–24 percent superphosphate [4]	32–48 percent superphosphate [4]	Bonemeal	Other phosphates [5]	Muriate of potash	Kainit and manure salts	Other potash materials [6]	Other fertilizer materials [7]	Liming materials [8]	Total
New England	6,116	2,047	1,216	271	2,750	794	13,797	6,672	145,085	650	3,441	354	3,034	------	3,038	1,485	------	190,750
Maine	400	200	150	50	400	30	------	20	23,418	300	300	------	280	------	100	500	------	26,148
New Hampshire [9]	785	266	212	30	100	------	------	------	19,842	175	------	14	444	------	34	418	------	22,320
Vermont	186	443	100	86	82	------	------	------	64,459	63	73	------	241	------	------	------	------	65,733
Massachusetts [9]	3,149	796	650	101	1,414	272	2,476	1,800	19,694	44	1,464	28	1,267	------	555	------	------	33,710
Rhode Island [9]	311	70	104	4	160	7	------	225	3,976	18	189	5	126	------	------	------	------	5,195
Connecticut [9]	1,285	272	------	------	594	485	11,321	4,627	13,696	50	1,415	307	676	------	2,349	567	------	37,644
Middle Atlantic	22,290	7,562	3,394	901	5,259	2,442	489	5,178	387,011	8,903	6,619	5,140	5,376	370	238	1,392	1,039	463,603
New York	8,607	4,780	736	212	2,895	198	288	2,526	218,388	1,345	2,162	913	1,759	7	71	71	968	245,926
New Jersey	3,718	1,072	1,006	580	1,245	535	100	818	7,708	50	1,091	273	2,052	30	60	24	------	20,362
Pennsylvania	2,312	511	634	19	397	1,469	86	1,647	104,745	194	2,251	2,924	668	23	92	3	71	118,046
Delaware	500	20	------	90	20	------	------	10	3,429	25	150	10	300	------	------	------	------	4,554
Maryland	5,851	146	931	------	501	240	------	108	15,801	80	639	904	383	310	15	294	------	26,203
District of Columbia	45	33	------	------	100	------	15	------	200	------	214	------	15	------	------	------	------	622
West Virginia	1,257	1,000	87	------	101	------	------	69	36,740	7,209	112	116	199	------	------	1,000	------	47,890
South Atlantic	425,506	19,776	1,518	2,589	1,584	1,287	97,040	17,407	308,360	14,561	2,290	43,014	43,218	18,633	34,579	12,652	72,940	1,116,954
Virginia	20,000	1,800	900	100	105	30	5,800	3,300	85,389	7,722	1,014	700	1,220	270	1,970	3,300	26,700	160,320
North Carolina	118,490	2,783	------	1,877	100	79	39,360	396	61,523	4,347	------	14,546	9,931	4,598	10,135	------	------	268,165
South Carolina	136,546	6,063	213	237	78	273	33,540	349	49,164	96	96	9,586	18,131	10,487	1,523	1,222	------	267,604
Georgia	130,000	5,000	30	270	100	------	13,470	300	100,093	2,039	------	2,000	8,000	2,000	1,000	------	------	264,302
Florida	20,470	4,130	375	105	1,201	905	4,870	13,062	12,191	357	1,180	16,182	5,936	1,278	19,951	8,130	46,240	156,563
East North Central	3,888	22,936	3,247	------	1,803	308	------	5,542	127,181	9,542	1,933	74,886	4,022	------	1,896	4,226	------	261,410
Ohio	1,281	7,462	1,832	------	112	------	------	3,026	42,007	669	488	687	------	------	[10] 839	------	------	58,403
Indiana	1,071	5,061	838	------	200	100	------	500	21,296	645	209	5,887	1,495	------	18	4,017	------	41,337
Illinois	529	4,836	93	------	717	196	------	8	13,384	302	684	68,312	------	------	[10] 1,039	11	------	90,111
Michigan	975	4,603	441	------	540	12	------	13	36,275	1,026	481	------	719	------	------	198	------	45,283
Wisconsin	32	974	43	------	234	------	------	1,995	14,219	6,900	71	------	1,808	------	------	------	------	26,276
West North Central	215	945	227	469	341	41	------	1,830	49,751	26,531	390	1,900	124	------	1,336	361	------	84,461
Minnesota	7	460	------	16	70	------	------	888	9,023	7,313	47	------	34	------	------	141	------	17,999
Iowa	23	74	------	453	18	------	------	------	5,945	3,560	19	530	90	------	2	220	------	10,934
Missouri	185	233	227	------	253	41	------	842	30,981	7,114	300	930	------	------	[10] 1,334	------	------	42,440
Kansas	------	178	------	------	------	------	------	100	3,802	8,544	24	440	------	------	------	------	------	13,088

South Central	270,898	53,999	72,763	2,473	120	45	23,315	344	480,087	63,763	4,620	17,127	17,191	2,331	2,283	106		1,011,465
Kentucky	1,187	461	322			25			199,502	21,118	256	3,620	174		147			226,812
Tennessee	14,000	800		35	30	10	900		108,886	17,288	1,030							142,979
Alabama [9]	114,000	6,000	2,000	1,300			7,290		124,720	2,315			10,000	300	600			268,525
Mississippi [9]	91,606	40,435	37,029	188			3,340		27,365	1,255		941	3,875	867	7			206,908
Arkansas [9]	18,099	1,728	13,928	52			1,340		3,942	15,180	63	15	2,044	735	343			57,469
Louisiana [9]	30,156	1,608	17,229	50	11	10	1,420	21	5,169	3,461	1,204	8,870	864	367	1,024			71,464
Oklahoma [9]	108	177	1		59		360		990	12	23	625	10					2,365
Texas [9]	1,742	2,790	2,254	848	20		8,665	323	9,513	3,134	2,044	3,056	224	62	162	106		34,943
Western	38,570	66,879	972	7,821		3,137	2,013	9,459	29,474	21,819	2,431	24,557			2,249	25,308		234,689
New Mexico		777							697	1,742		325						3,541
Colorado		500				50		56		2,800	100					100		3,606
Arizona	1,834	1,071	56	376				100	779	3,642		659						8,517
Washington	800	3,500		2,900		200		300	11,743	2,000	300							21,743
Oregon	1,741	2,000	916			150		1,200	8,721	2,516	300	2,500						20,044
California	34,195	59,031		4,545		2,737	2,013	7,803	7,534	9,119	1,731	21,073			[10] 2,249	25,208		177,238
Other States [11]	5	50		5	20			10		21,158	50	105,179	40		10			126,527
Continental United States	767,488	174,194	83,337	14,529	11,877	8,054	136,654	46,442	1,526,949	166,927	21,774	272,157	73,005	21,334	45,629	45,530	73,979	3,489,859
Noncontiguous Territories	22,000	63,000		1,200					5,600	100		2,000	7,000		13,000	1,000		114,900
Total, United States	789,488	237,194	83,337	15,729	11,877	8,054	136,654	46,442	1,532,549	167,027	21,774	274,157	80,005	21,334	58,629	46,530	73,979	[12] 3,604,759

[1] Uramon, calcium nitrate, cal-nitro, calurea.

[2] Includes meal obtained direct from oil mills but not recorded in State fertilizer reports; also cottonseed meal denatured with castor pomace. Arkansas reports shipments of 15,562 tons, but most of this is thought to have been used as feed.

[3] Castor pomace, fish scrap, linseed meal, soybean meal, process tankage, guano, sewage sludge, dried blood, peat, garbage tankage, etc.

[4] Includes Government-distributed superphosphate.

[5] Ammonium phosphates, precipitated bone, raw phosphate rock, basic slag, basic lime phosphate, calcium metaphosphate, fused phosphate rock, etc., 61,497 tons of raw phosphate rock and 42,682 tons of basic slag that could not be broken down by States are included under "Other States."

[6] Sulfate of potash, nitrate of soda-potash, nitrate of potash, cotton-hull ashes, wood ashes, tobacco stems, sulfate of potash-magnesia.

[7] Materials reported as miscellaneous, peat, minor element materials, land plaster.

[8] Only those tonnages given in State fertilizer grade-tonnage reports.

[9] State fiscal year ended 1941.

[10] All potash salts.

[11] Idaho, Montana, Nebraska, Nevada, North Dakota, South Dakota, Utah, and Wyoming. Under "Other phosphates" are included 61,497 tons of raw phosphate rock and 42,682 tons of basic slag, sold to farmers in unspecified States.

[12] This total includes about 100,000 tons of materials not included in the figures in table 1.

Nitrate of soda is used in very large quantities as a top or side dressing material in all the Southeastern States. The five States of North Carolina, South Carolina, Georgia, Alabama, and Mississippi used for this purpose 591,000 tons in 1941, or 74.8 percent of the total. California, Louisiana, Hawaii, Florida, and Virginia also used substantial tonnages for this purpose. Sulfate of ammonia is preferred for use on alkaline soils or in growing rice. Puerto Rico and California accounted for nearly half the total consumption of this material, with Mississippi using another 17 percent. The use of cyanamid as a separate material is largely concentrated in the Mississippi Delta. Mississippi, Arkansas, and Louisiana consumed 81.8 percent of the total in 1941. Nearly one-third of all other chemical nitrogen employed in the form of separate materials was used in California, where anhydrous ammonia is applied directly to irrigation ditches. Bonemeal, tankage, and dried animal manures are used throughout the country. Their principal use is in growing flowers and vegetables in home gardens. In 1941, five South Atlantic States used 71.0 percent of the cottonseed meal; the South Central States, 17.0 percent; and California, 1.5 percent. The remaining 10 percent was practically all consumed in growing cigar-wrapper tobacco in the Connecticut River Valley. Practically all the fish scrap was sold in States along the Atlantic and Pacific coasts. Certain other natural organics of little or no importance nationally are important locally; for example, cocoa shells near certain chocolate factories, king crab meal in New Jersey, and apricot-seed meal in California.

TABLE 9.—*Consumption of nitrogen in the form of separate materials, by regions of the United States and kind of material, 1934, 1939, and 1941*

Region	Year	Nitrate of soda		Ammonium sulfate		Other chemical nitrogenous material		Natural organics		Total, all forms
		Tons of N	Percent	Tons of N	Percent	Tons of N	Percent	Tons of N	Percent	Tons of N
New England	1934	1,078	34.23	615	19.53	659	20.93	797	25.31	3,149
	1939	990	34.21	325	11.23	362	12.51	1,217	42.05	2,894
	1941	978	26.33	424	11.41	709	19.08	1,604	43.18	3,715
Middle Atlantic	1934	2,830	51.61	1,452	26.48	632	11.52	570	10.39	5,484
	1939	2,151	42.65	609	12.08	1,241	24.61	1,042	20.66	5,043
	1941	3,586	50.95	1,367	19.42	1,215	17.26	871	12.37	7,039
South Atlantic	1934	25,986	72.33	5,944	16.55	3,055	8.50	940	2.62	35,925
	1939	44,127	80.64	4,831	8.83	4,566	8.34	1,197	2.19	54,721
	1941	71,870	80.52	5,108	5.72	4,352	4.88	7,923	8.88	89,253
East North Central	1934	430	26.27	924	56.44	152	9.29	131	8.00	1,637
	1939	498	13.24	2,121	56.39	517	13.75	625	16.62	3,761
	1941	622	9.37	4,748	71.52	711	10.71	558	8.40	6,639
West North Central	1934	28	13.40	84	40.19	59	28.23	38	18.18	209
	1939	36	9.21	153	39.13	61	15.60	141	36.06	391
	1941	28	6.18	195	43.05	81	17.88	149	32.89	453
South Central	1934	10,147	59.12	3,029	17.65	3,837	22.36	149	.87	17,162
	1939	31,236	57.71	9,539	17.62	12,025	22.22	1,329	2.45	54,129
	1941	43,344	58,85	11,177	15.17	17,093	23.20	2,047	2.78	73,661
Western	1934	413	4.33	5,617	58.87	1,900	19.92	1,610	16.88	9,540
	1939	952	3.88	14,008	57.05	8,691	35.40	901	3.67	24,552
	1941	6,213	18.60	13,693	41.00	12,301	36.83	1,191	3.57	33,398
Continental United States.	1934	40,912	55.97	17,665	24.16	10,294	14.08	4,235	5.79	73,106
	1939	79,990	54.98	31,586	21.71	27,463	18.88	6,452	4.43	145,491
	1941	126,641	59.13	36,712	17.14	36,462	17.03	14,343	6.70	214,158

The kinds of materials used for separate application or home mixing have changed considerably in the past 30 or 40 years. Although no statistics are available to show the extent of these changes until recent years, it is known that organics were formerly used in very large proportions. As may be seen from table 9, more than half the nitrogen for separate use was in the form of nitrate of soda in 1934, 1939, and 1941. The proportion was highest in the last of the 3 years. This change was not uniform throughout the country. Its use as such decreased in the New England and the North Central States, but increased greatly in the Western States. On the other hand, separate use of sulfate of ammonia decreased about one-third, and the changes, by regions, were, in general, opposite to those of nitrate of soda in the same section of the country. These changes are thought to be temporary, caused by shipping difficulties brought on by the war. The proportion of other chemical nitrogenous materials increased greatly in the Western region, where the practice of adding anhydrous ammonia to irrigation water has grown rapidly.

Phosphatic Materials

By multiplying the tonnages of the various materials as given in table 6 by the average available P_2O_5 content of each, it was learned that of the total consumption of phosphoric acid as fertilizer, 78.4 percent was provided by normal superphosphate, 12.3 percent by concentrated superphosphate, 2.5 percent by ammonium phosphate, 2.2 percent by wet-mixed base goods, 3.6 percent by bonemeal and other organics, and 1.0 percent by basic slag and other miscellaneous materials. As pointed out above, about 87 percent of the phosphoric acid in commercially mixed fertilizers in recent years was derived from normal superphosphate. (See table 7.) For this purpose run-of-pile superphosphate is used. This ungraded material, on the average, contained 19.33 percent available phosphoric acid in 1941. No run-of-pile superphosphate was produced containing less than 18 percent of available P_2O_5, and relatively little (215,689 tons, or 4.3 percent of the total) containing less than 18.5 percent. For details by States on the quantities and percentages of contained P_2O_5 of superphosphate produced in 1941, see Jacob (*4*). In commercial mixtures 9 percent of the phosphoric acid was in the form of concentrated phosphates. Most of this concentrated material, consisting of double superphosphate and ammonium phosphates, is used in making double-strength mixtures in New England, the North Central, and the Western States. The remaining 3 or 4 percent of the phosphoric acid comes principally from bonemeal, fish scrap, and tankage. Bonemeal is used in mixtures almost exclusively in the North Central States, especially Indiana, Illinois, and Missouri. Most of the animal tankage is used in the North Central States. Fish scrap is used chiefly in the Middle Atlantic, South Atlantic, and Pacific Coast States.

Considerable changes have occurred in recent years in the proportions of the different grades of superphosphate on the market. The most widely used grade 30 years ago was 14 percent superphosphate, and grades containing 18 percent or more of available P_2O_5 were of little importance. In 1925, as may be seen from table 10, the 14 percent grade had decreased to a minor position, and in 1941 it had practically disappeared; 16 percent superphosphate accounted for 85 percent or more of the total but only 14 percent in 1941, and in all

probability it will soon be as obsolete as the 14 percent grade. The 10 and 12 percent grades, which at one time were also principal grades, had completely disappeared in 1941. Twenty percent superphosphate is rapidly increasing in importance. The consumption of concentrated grades is increasing also, but their relative position in 1941 decreased because that of 20 percent goods increased so much more rapidly—the Agricultural Adjustment Administration shifted its purchases to the 20 percent grade, so that as much of the 48 percent material as possible could be shipped to Great Britain. These changes are shown graphically in figure 4.

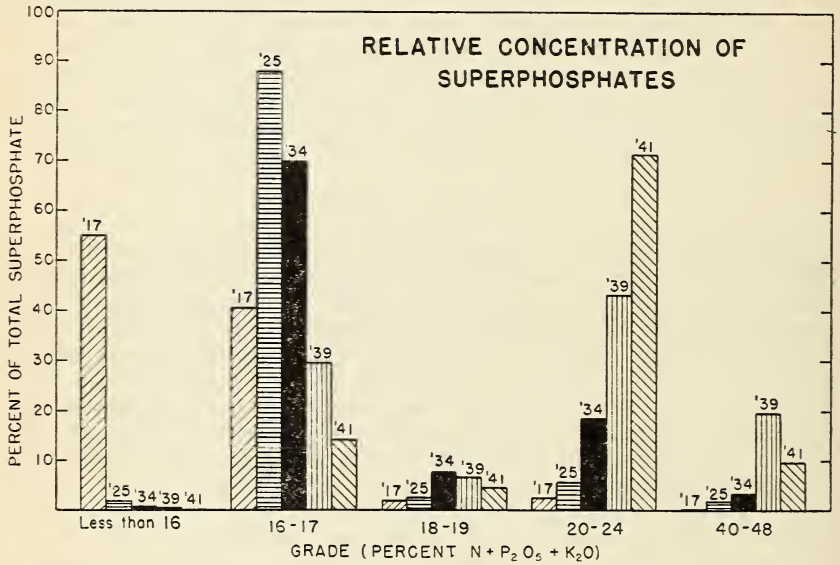

FIGURE 4.—Proportions of all superphosphate consisting of different grades sold in certain years.

TABLE 10.—*Tonnage and proportion of superphosphate consumed as such, by grades, 1925–41*

Superphosphate grade	1925		1933–34		1938–39 [1]		1941 [2]	
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent
10–14 percent	16,794	1.92	3,050	0.64	3,999	0.43	684	0.04
16–17 percent	773,040	88.17	335,711	69.93	274,854	29.69	240,915	14.17
18–19 percent	22,858	2.60	36,655	7.63	60,279	6.51	78,025	4.59
20–24 percent	50,293	5.74	88,288	18.39	398,657	43.07	1,212,925	71.37
30–32 percent	-------	0	100	.02	7,424	.80	2,243	.13
40–48 percent	13,762	1.57	16,284	3.39	180,402	19.50	164,792	9.70
All grades	876,747	100.00	480,088	100.00	925,615	100.00	1,699,584	100.00

[1] Includes 35,751 tons of 20 percent superphosphate and 123,876 tons of 45–48 percent superphosphate distributed by A. A. A. and 18,356 tons of 45–48 percent superphosphate distributed by T. V. A.
[2] Includes 728,320 tons of 18–20 percent (mostly 20 percent) superphosphate and 95,280 tons of 45–48 percent superphosphate distributed by A. A. A. and 18,353 tons of double superphosphate distributed by T. V. A.

The consumption of each grade of commercially distributed and Government-distributed superphosphate is shown, by States, in table 23 of the Appendix. The weighted-average grade of the commercially distributed normal grades is 18.6 of available phosphoric

acid; of all commercially distributed superphosphates, 20.6; of all Government-distributed superphosphates, 25.4; and of all superphosphates for direct use by farmers, 23.0 percent.

The actual percentage content of available phosphoric acid was, on the average, 0.58 more than the average grade of superphosphate in 1941. This overrun varied from 0.09 in California to 1.73 percent in Massachusetts.

Ten years ago the weighted-average available phosphoric-acid content of normal superphosphate, as found by analysis, exceeded 20 percent in only one State—Wisconsin—and the United States average was 17.6 percent. In 1941 the United States average was 19.28 percent, and that for over half of the States exceeded 20 percent. These figures do not include any concentrated superphosphate. The details are set forth in table 24 of the Appendix.

Potassic Materials

In 1941, 72 percent of the total consumption of potash was in the form of 60 percent muriate, as may be seen from table 11. This is an astonishing percentage when it is recalled that 60 percent muriate of potash was introduced as a fertilizer only about 20 years ago and that in 1920 even 50 percent muriate accounted for only 26.4 percent of the total. In 1941 only 11.2 percent of the potash was provided by 50 percent muriate. Most of the rest was supplied by 25 percent manure salts and sulfate of potash. Low-grade kainit and nitrate of potash, which formerly came from Germany, have disappeared from fertilizer use, at least for the present.

In making mixed fertilizers in 1941, 91 percent of the potash consumed was derived from high-grade salts, mostly 60 percent muriate. Up until 1929 about 50 percent of the potash in mixed goods was derived from 50 percent salts, and most of the other half from 14 and 20 percent materials. Although imports of 14 and 20 percent kainit from Europe practically ceased in 1939, some 20 percent material continued to come from France until 1940. They are no longer on the market. Only 2.5 percent of the potash in mixed goods in 1941 was in the form of miscellaneous materials. This includes many sources, several of which, like nitrophoska and sulfate of potash-magnesia, were very hard to get in 1940 and early in 1941, because imports from Germany had been cut off in 1939 and stocks were exhausted. A considerable tonnage of sulfate of potash-magnesia was sold in 1941 by the new domestic producer, but it is believed that this did not show up in mixed goods to any great extent until 1942.

Proportionately less tonnages of potash salts are sold to farmers as such than materials supplying nitrogen and phosphoric acid. About 80,000 tons of muriate was sold to farmers, and 48 percent of this was the 50 percent grade. About 19,000 tons of kainit was used to top-dress crops, mostly cotton in the Southeast. This practice is much less common than formerly. Approximately 19,000 tons of nitrate of soda-potash was used as a separate material in 1941, 14,500 tons in Florida alone as a separate application, chiefly to citrus.

TABLE 11.—*Potash consumption,*[1] *by kind of material, 1910–41*

Year	12–14 percent kainit		20–25 percent manure salts		30 percent manure salts		50 percent muriate		60 percent muriate		Total K_2O
	Tons K_2O	Percent	Tons K_2O	Percent	Tons K_2O	Percent	Tons K_2O	Percent	Tons K_2O	Percent	
1910	65,200	27.51	23,500	9.92	4,500	1.90	69,250	29.22	0	0.00	
1920	51,700	20.02	66,800	25.87	4,500	1.74	68,000	26.35	0	0	
1925	25,400	8.98	76,000	26.88	6,000	2.12	85,000	30.08	16,500	5.84	
1930	17,600	5.18	75,000	22.07	9,000	2.65	145,000	42.66	30,000	8.83	
1935	300	.09	28,700	9.50	13,000	4.30	107,500	35.57	93,000	30.77	
1939	100	.03	13,500	3.51	5,500	1.43	87,100	22.64	217,600	56.55	
1940	0	0	9,500	2.17	2,300	.53	80,800	18.47	294,200	67.27	
1941	0	0	27,600	6.03	1,100	.24	51,400	11.22	330,800	72.22	
	Sulfate of potash-magnesia		Sulfate of potash		Nitrate of soda-potash		Nitrate of potash		Other potash material		Total potash
											Tons
1910	3,680	1.55	20,300	8.57	0	0.00	200	0.08	50,370	21.25	237,000
1920	870	.34	8,500	3.29	2,000	.77	0	0	55,830	21.62	258,200
1925	3,560	1.26	37,500	13.26	1,100	.39	0	0	31,640	11.19	282,700
1930	3,540	1.04	41,000	12.06	1,600	.47	1,100	.32	16,060	4.72	339,900
1935	5,800	1.92	30,000	9.93	4,100	1.36	6,000	1.99	13,800	4.57	302,200
1939	4,600	1.20	32,800	8.53	8,300	2.16	4,200	1.09	11,000	2.86	384,700
1940	980	.22	30,200	6.91	8,300	1.90	580	.13	10,500	2.40	437,360
1941	5,330	1.16	27,170	5.94	5,400	1.18	0	0	9,200	2.01	458,000

[1] As determined from potash deliveries. Includes Puerto Rico and Hawaii.

PLANT-FOOD CONSUMPTION

In order to determine the quantities of plant food consumed, it is necessary to have the tonnage of the different classes of fertilizers used and the average plant-food content of each. The tonnages of the various classes have already been given.

Nutrient Content of Fertilizers

The average total N, P_2O_5, and K_2O contents of different classes of fertilizers are given by States in table 12. The total nutrient content of mixed fertilizers is shown for each State on a map as figure 5.

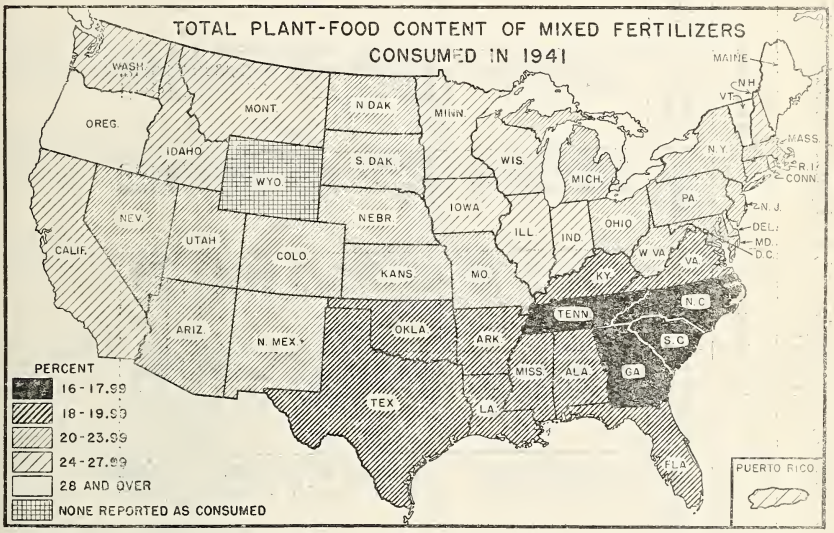

Figure 5.—Total plant-food content of mixed fertilizers in 1941, by States.

When these results are compared with similar data given by Mehring and Deming (*6*) for earlier years, it is observed that the trend is toward higher proportions of each of the three principal plant nutrients in nearly all States. The average available plant nutrients of all mixed fertilizers consumed in the United States increased from 3.55 percent N, 9.18 percent P_2O_5, and 5.37 percent K_2O in 1934 to 3.82, 9.69, and 6.70 percent, respectively, in 1941. This was an increase in total plant-food content from 18.10 to 20.22 percent.

A decided upswing is noted in plant-food content in the fertilizers consumed in North Carolina and South Carolina. For a number of years these States have lagged behind in the movement toward the more economical higher analysis grades, but at last they are swinging into line with the other States. This is extremely important because of the relatively large tonnages involved. In 1920 the average plant-nutrient content of mixed fertilizers in the United States was 2.2 percent N, 8.9 percent P_2O_5, and 2.8 percent K_2O, or a total of 13.9 percent, and the total for practically every State was about 14 percent.

TABLE 12.—*Weighted-average percentages of available nitrogen, phosphoric acid, and potash contained in fertilizers consumed,[1] by States, in 1941*

State or Territory	N-P-K mixtures			P-K mixtures		All mixtures			Commercially distributed fertilizers		
	Nitrogen	Phosphoric acid	Potash	Phosphoric acid	Potash	Nitrogen	Phosphoric acid	Potash	Nitrogen	Phosphoric acid	Potash
Alabama [2]	4.49	8.75	5.06	12.26	6.31	4.45	8.78	5.07	6.22	8.03	3.91
Arizona						7.36	13.57	1.81	11.44	20.88	.39
Arkansas [2]	4.35	9.03	6.53	12.20	4.20	4.40	9.00	6.50	8.78	5.36	4.72
California	7.80	9.86	6.80	12.58	10.67	7.70	9.80	6.50	14.67	7.91	2.77
Colorado	5.25	12.50	5.20			5.43	12.70	5.05	4.21	26.13	2.26
Connecticut [2]	5.88	9.28	7.88	20.00	17.69	5.64	8.41	7.71	5.53	7.81	6.59
Delaware	3.83	9.23	8.57	12.00	11.00	3.32	9.60	8.89	3.22	10.29	8.20
District of Columbia [3]	5.05	8.67	5.77			4.70	9.20	5.30	4.60	11.00	3.90
Florida	4.28	7.66	7.41	11.27	9.81	5.58	7.23	7.00	5.03	6.56	6.84
Georgia [4]	3.52	8.82	5.16	12.07	5.98	3.45	8.85	5.12	5.20	7.90	4.65
Idaho [3]						4.00	9.00	11.00	.05	44.00	.21
Illinois [5]	2.95	12.23	7.94	12.01	14.51	2.15	12.20	9.86	1.72	7.05	4.08
Indiana	2.38	12.64	8.05	13.23	13.56	1.69	12.95	9.83	2.10	12.71	8.96
Iowa	2.56	12.55	7.40	13.13	17.53	1.94	12.66	9.86	2.13	14.24	7.14
Kansas	2.30	12.00	3.40	14.30	5.50	2.51	13.88	3.74	1.21	26.65	1.08
Kentucky	3.22	9.38	5.56	10.48	5.22	2.98	9.79	5.43	2.04	13.29	3.33
Louisiana [2]	4.62	9.89	4.86	13.51	5.50	4.35	10.21	4.81	8.56	7.16	3.19
Maine	5.94	11.10	13.05	18.79	21.24	6.08	11.21	13.65	6.00	11.10	13.30
Maryland	3.34	10.08	7.74	12.91	8.53	3.10	10.29	7.80	3.40	10.69	6.84
Massachusetts [2]	5.46	8.82	7.99	19.86	21.54	5.45	8.85	8.03	5.72	8.83	6.91
Michigan	2.69	12.72	7.39	14.07	16.30	2.35	12.86	8.40	2.79	13.11	7.44
Minnesota	3.18	13.99	7.15	10.09	24.46	2.32	13.05	12.06	1.84	18.66	8.14
Mississippi [2]	4.54	8.62	5.02	12.65	6.48	4.57	8.55	5.07	11.39	4.61	2.69
Missouri	2.70	12.55	4.93	14.54	9.14	2.53	12.69	5.20	1.59	15.98	3.38
Montana [3]						5.50	13.50	5.00	1.00	40.00	1.00
Nebraska [3]						4.00	10.50	8.00	1.00	40.00	1.00
Nevada [3]						4.00	12.00	4.00	2.00	35.00	2.00
New Hampshire [2]	5.57	10.36	9.26	20.13	19.42	5.54	10.41	9.32	5.76	10.64	8.31
New Jersey	4.34	10.42	8.61	11.42	11.48	4.41	9.87	8.87	4.66	9.81	8.53
New Mexico	4.84	11.76	4.99			4.30	12.90	4.70	3.40	35.00	.52

New York	4.51	10.94	7.42	19.05	11.76	4.46	11.03	7.47	3.40	13.81	4.68
North Carolina	3.32	8.65	5.02	9.72	6.79	3.35	8.54	5.16	4.56	7.76	4.86
North Dakota [3]						2.30	14.50	4.50	1.00	35.00	1.00
Ohio	2.41	12.13	6.73	13.43	9.78	2.17	12.78	7.39	2.57	12.84	6.71
Oklahoma	3.97	9.36	5.60	12.09	4.12	3.97	9.35	5.60	3.76	9.63	4.33
Oregon	7.48	11.86	10.08			7.48	11.86	10.08	9.85	12.83	6.32
Pennsylvania	3.17	11.47	7.02	16.26	9.79	3.03	11.64	7.13	2.49	13.62	5.37
Puerto Rico	9.28	6.47	11.84			9.28	6.48	11.82			
Rhode Island [2]	5.67	10.40	8.68	20.50	20.30	5.62	10.48	8.78	5.02	11.54	7.02
South Carolina	3.63	8.62	5.36	10.90	6.95	3.74	8.53	5.53	5.97	6.82	5.36
South Dakota [3]						5.00	12.00	4.00	1.00	40.00	1.00
Tennessee [3]	3.11	9.36	4.79	10.57	4.08	2.20	9.50	4.70	3.23	10.90	3.65
Texas [2]	4.59	9.34	4.89	12.09	4.12	4.59	9.40	4.53	5.42	10.29	3.87
Utah [3]						4.10	12.50	4.50	1.00	39.00	.50
Vermont	5.49	12.02	11.37	20.11	20.37	5.49	12.02	11.37	5.55	12.62	9.49
Virginia [4]	3.59	9.70	5.38	12.60	6.64	3.50	9.70	5.50	3.95	9.80	4.55
Washington						4.50	9.70	10.50	6.90	14.00	5.50
West Virginia	3.21	11.62	6.78	14.00	6.71	3.09	11.59	6.73	3.19	12.97	4.71
Wisconsin	2.95	13.16	9.20	17.49	15.05	2.19	14.28	10.71	2.33	13.84	10.32
Wyoming [3]										45.00	
Continental United States	3.77	9.64	6.37	12.87	10.38	3.67	9.77	6.60	5.13	9.39	5.35
Entire United States	3.94	9.57	6.49	12.87	10.38	3.83	9.69	6.70	5.38	9.25	5.47

[1] Exclusive of Government distribution.
[2] State fiscal year ended in 1941.
[3] Estimated from 1939 or 1940 data.
[4] Estimated from 1941–42 data.
[5] Including a large tonnage of raw phosphate rock.

In 1920 the average for South Carolina was 2.7, 8.6, and 2.9 percent, respectively, or a total of 14.2 percent. In 1939 these figures were 3.1, 8.4, and 4.6, with a total of only 16.1 percent, but by this time most of the States were using fertilizers with an average $N–P_2O_5–K_2O$ content of more than 20.0 percent. In 1941, however, the average for South Carolina was 3.74 percent N, 8.53 percent P_2O_5, and 5.53

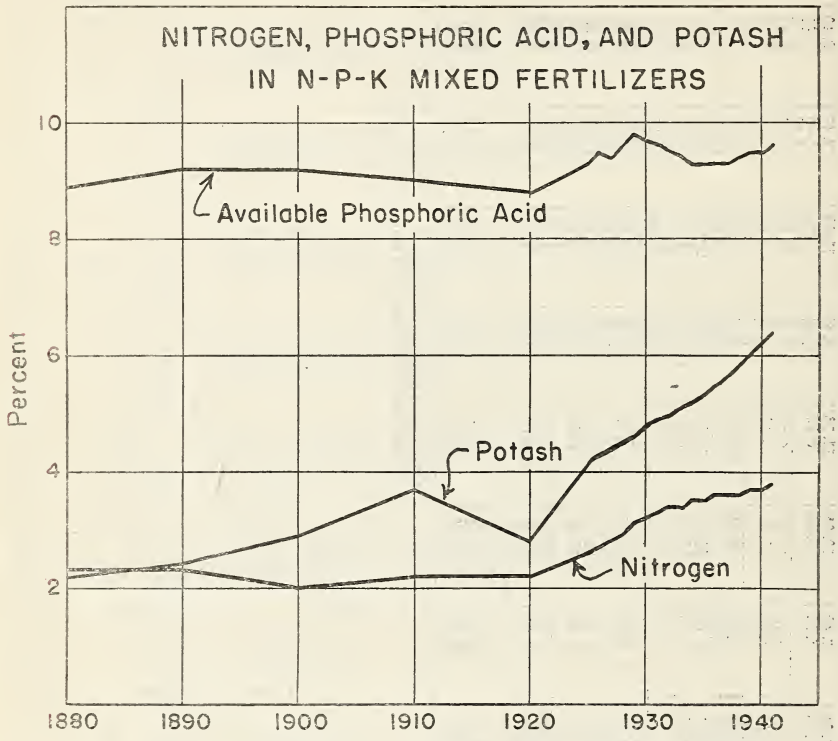

FIGURE 6.—Percentage of N, P_2O_5, and K_2O in N–P–K mixed fertilizers, 1880–1941.

percent K_2O, or a total of 17.8 percent. This was a very substantial improvement for only 2 years. Also, in North Carolina, the average increased from 3.26, 8.30, and 4.97 in 1939 to 3.35, 8.54, and 5.16 percent, respectively, in 1941, or from a total of 16.53 in 1939 to 17.05 in 1941.

The trend toward higher analysis fertilizers is shown for the entire country over a considerable period of years in figure 6 as it relates to N–P–K mixtures and in figure 7 for P–K fertilizers.

The weighted average available plant nutrients of all mixtures and fertilizers sold in the continental United States in the spring and fall of 1941 are given in table 13. Relatively more nitrogen and less available phosphoric acid were used in the spring season. The potash content was approximately the same in both seasons. These same general relations hold for practically every State.

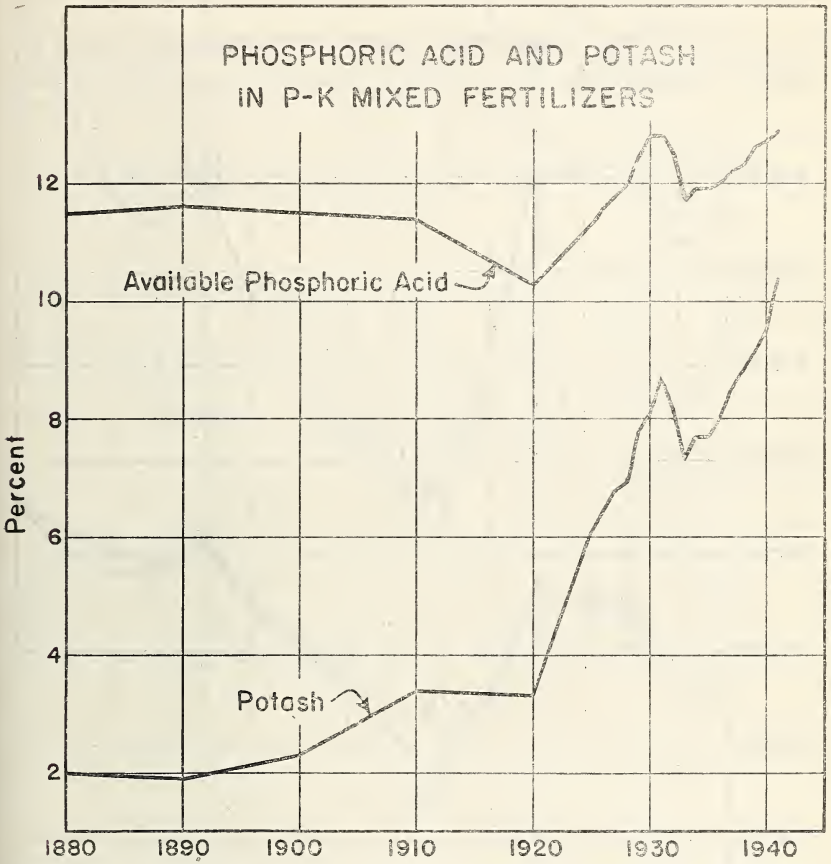

FIGURE 7.—Percentage of P_2O_5 and K_2O in P-K mixed fertilizers, 1880–1941.

The total consumption of plant nutrients in the form of commercial fertilizers and fertilizers distributed by the Government was 1,900,000 tons in 1941, as compared with 1,500,000 tons in 1939, 1,620,000 tons in 1937, and 1,200,000 tons in 1935. This included the territories of Hawaii and Puerto Rico. The proportions of the several plant nutrients making up these totals are given in table 14.

Tonnage

The tonnage of nitrogen, available phosphoric acid, and potash consumed in each State was determined from the tonnage of fertilizers consumed and the average plant-nutrient content of these fertilizers.

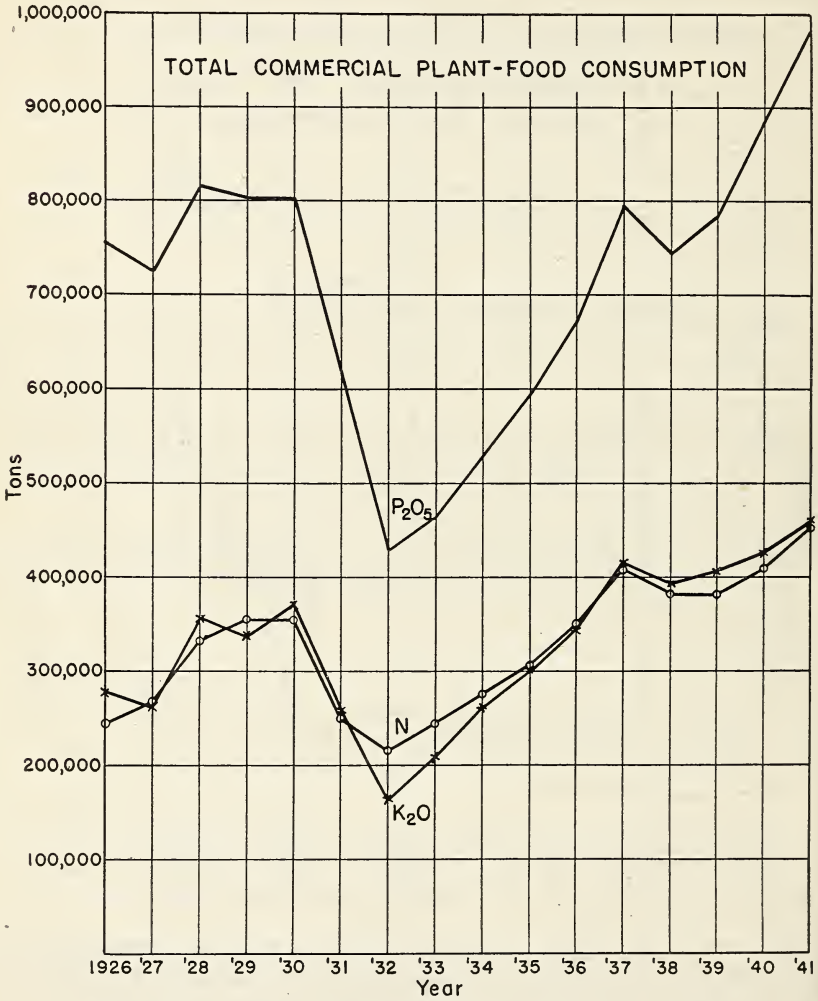

FIGURE 8.—Total commercial plant-food consumption, 1926–41.

The results are presented in table 15. The figures in this table do not include material distributed by Government agencies. Similar figures plotted in figure 8 do include Government-distributed phosphates.

NITROGEN CONSUMPTION

In 1941, the total consumption of nitrogen as fertilizer was 454,000 tons, of which 406,000 tons (89.4 percent) was derived from chemical sources and 48,000 (10.6 percent) from natural organics. The proportion of the total nitrogen in all commercial fertilizers derived from natural organics has been declining for years, as may be seen in table 16.

Thus, total nitrogen consumption has doubled in the last 20 years and increased 50 percent in the last 10. For additional information on nitrogen consumption in recent years, see Mehring (*5*).

TABLE 13.—*Weighted-average available plant nutrients of all mixtures and all commercially distributed fertilizers for the spring and fall of 1941*

Season	All mixtures			All fertilizers		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Spring	3.80	9.64	6.60	5.36	9.12	5.31
Fall	3.11	10.34	6.58	4.04	10.70	5.50

TABLE 14.—*Percentages of nitrogen, phosphoric acid, and potash in commercial fertilizers in certain years*

Year	Plant nutrients		
	N	P_2O_5	K_2O
1935	25.5	49.4	25.1
1937	25.4	49.0	25.6
1939	24.7	49.6	25.7
1941	23.9	51.9	24.2

TABLE 15.—*Tonnage of commercially distributed plant food consumed, by States, in 1941*

Region and State or Territory	In mixed fertilizers			In materials sold separately			Totals		
	Nitrogen	Phosphoric acid	Potash	Nitrogen	Phosphoric acid [1]	Potash	Nitrogen	Phosphoric acid [1]	Potash
New England	14,549	25,831	28,402	3,824	6,101	3,592	18,383	31,932	31,994
Maine	8,694	16,030	19,520	426	842	696	9,120	16,872	20,216
New Hampshire [2]	462	882	736	275	492	283	741	1,374	1,019
Vermont	507	1,111	1,051	189	472	140	696	1,583	1,191
Massachusetts [2]	2,519	4,090	3,711	1,270	1,759	866	3,789	5,849	4,577
Rhode Island [2]	834	936	834	94	447	44	928	1,443	878
Connecticut	1,826	2,722	2,495	1,580	2,089	1,563	3,406	4,811	4,059
Middle Atlantic	31,891	93,758	63,647	7,803	57,353	4,334	39,694	151,111	70,921
New York	9,924	24,543	16,622	2,990	27,910	1,154	12,914	52,453	17,776
New Jersey	7,269	16,268	14,670	1,324	1,821	1,109	8,593	18,089	15,779
Pennsylvania	8,013	30,781	18,875	1,339	20,375	1,345	9,352	51,153	20,170
Delaware	996	2,830	2,667	115	670	162	1,111	3,550	2,829
Maryland	4,560	15,137	11,474	1,283	3,243	287	5,846	18,380	11,761
District of Columbia	47	92	53	45	128	25	92	220	78
West Virginia	1,082	4,057	2,356	704	3,205	232	1,786	7,263	2,588
South Atlantic	97,337	223,379	147,801	79,427	45,744	36,349	176,764	269,123	184,150
Virginia	10,500	29,100	16,500	5,300	10,100	1,700	15,800	39,200	18,200
North Carolina	27,777	70,581	42,701	19,790	8,993	7,283	47,567	79,574	49,984
South Carolina	16,272	37,112	24,050	24,134	9,047	12,247	40,406	46,159	36,297
Georgia	19,330	40,530	28,672	22,500	14,149	8,892	41,929	63,700	37,491
Florida	23,458	37,046	35,853	7,594	3,461	6,371	31,052	40,586	42,280
East North Central	17,462	109,283	73,035	7,017	17,293	3,179	24,479	126,576	76,255
Ohio	7,618	41,847	25,944	2,474	5,553	405	10,092	50,120	26,349
Indiana	4,072	31,206	23,687	1,669	3,541	803	5,741	34,747	24,115
Illinois	1,033	5,830	4,733	1,189	[3] 3,245	534	2,222	[3] 9,103	5,270
Michigan	3,388	18,538	12,109	1,327	3,615	464	4,715	22,151	12,573
Wisconsin	1,351	8,812	6,609	358	1,337	959	1,709	10,149	7,568
West North Central	1,574	8,431	4,912	490	14,253	571	2,064	22,741	5,483
Minnesota	389	1,849	1,709	62	2,116	21	391	3,965	1,730
Iowa	233	1,521	1,185	137	951	55	370	2,472	1,240
Missouri	900	4,563	1,849	191	6,449	470	1,091	10,962	2,319
North Dakota	7	41	14	14	691	7	21	735	21
South Dakota	3	6	2	2	194	3	5	200	5
Nebraska	2	5	4	16	715	14	18	720	18
Kansas	100	553	149	68	3,137	1	168	3,690	150

South Central	37,419	83,026	45,915	75,419	42,575	11,006	112,838	125,601	56,921
Kentucky	2,036	6,688	3,710	338	8,780	166	2,374	15,468	3,876
Tennessee	2,064	8,913	4,410	2,505	6,506	753	4,569	15,419	5,163
Alabama [2]	15,304	30,194	17,436	20,822	16,444	5,273	36,126	46,638	22,709
Mississippi [2]	5,948	11,129	6,599	31,129	3,877	2,157	37,077	15,006	8,756
Arkansas [2]	2,507	5,129	3,704	7,304	861	1,571	9,811	5,990	5,275
Louisiana [2]	4,437	10,414	4,906	11,142	2,617	900	15,579	13,031	5,806
Oklahoma [2]	223	524	314	56	191	7	279	715	321
Texas [2]	4,900	10,035	4,836	2,123	3,299	179	7,023	13,334	5,015
Western	8,696	12,151	8,504	36,180	27,884	2,241	44,876	40,035	10,745
Montana	28	68	25	17	1,732	20	45	1,800	45
Idaho	4	9	11	0	3,071	4	4	3,080	15
Wyoming					765			765	
Colorado	147	343	136	116	1,292	5	263	1,635	141
New Mexico	15	45	16	117	1,312	4	132	1,357	20
Arizona	153	282	38	964	1,756	0	1,117	2,038	38
Utah	12	38	14	16	1,054	0	28	1,092	14
Nevada	8	24	8	2	151	2	10	175	10
Washington	450	970	1,050	1,482	2,950	490	1,932	3,920	1,540
Oregon	1,102	1,747	1,485	1,361	1,461	95	2,463	3,208	1,580
California	6,777	8,625	5,721	32,105	12,340	1,621	38,882	20,965	7,342
Territories	14,450	9,950	16,070	19,985	3,095	8,355	34,435	13,045	24,425
Hawaii	4,000	2,800	3,200	14,125	2,825	7,925	18,125	5,625	11,125
Puerto Rico	10,450	7,150	12,870	5,860	270	430	16,310	7,420	13,300
Continental United States	208,928	555,919	375,266	210,170	211,203	61,263	419,098	767,122	436,529
Total United States	223,378	565,869	391,336	230,155	214,298	69,618	453,533	780,167	460,954

[1] Material distributed by Government agencies not included.
[2] State fiscal year, 1940-41.
[3] Including raw phosphate rock.

TABLE 16.—*Nitrogen consumption and proportion of organic nitrogen to total nitrogen, 1900–41*

Year	Total nitrogen	Organic nitrogen	Proportion of natural organic N to total N	Year	Total nitrogen	Organic nitrogen	Proportion of natural organic N to total N
	Tons	*Tons*	*Percent*		*Tons*	*Tons*	*Percent*
1900	72,000	63,000	87.5	1931	302,000	60,100	19.9
1910	145,000	71,000	49.0	1936	351,000	59,000	16.8
1920	228,000	57,000	25.0	1939	390,000	48,000	12.3
1925	269,000	65,000	24.2	1941	453,500	48,000	10.6

PHOSPHORIC ACID CONSUMPTION

Of the 985,200 tons of available phosphoric acid consumed in 1941, 35,500 tons, or 3.6 percent of the total, was derived from natural organics, as bonemeal, tankage, and fish scrap. The corresponding percentages were 24.2 percent of the total in 1900, 14.2 percent in 1920, and 6.1 percent in 1930. The remaining 949,500 tons consumed in 1941 was derived from mineral sources. Of the total, 205,000 tons was distributed by Government agencies and 780,200 tons by commercial organizations. The total available tonnage of phosphoric acid distributed commercially and that by the Government was as follows:

Year:	*Commercially distributed*	*Government distributed*
1934	530,000	0
1935	586,600	6,170
1936	661,800	11,100
1937	775,100	20,340
1938	708,500	35,220
1939	709,600	73,450
1940	737,800	149,700
1941	780,200	205,000

The quantity distributed by the Agricultural Adjustment Administration and the Tennessee Valley Authority together has doubled every year since 1935, except in 1941, when it increased substantially. Nevertheless, commercial distribution does not appear to have suffered, since it too has increased.

POTASH CONSUMPTION

The total agricultural consumption of potash in 1941 was 461,000 tons—441,500 tons (95.8 percent) of which was derived from mineral sources; 12,000 tons (2.6 percent) from natural organics, as tobacco stems; and 7,500 tons (1.7 percent) from miscellaneous sources, as ashes, distillery waste, and cement kiln dust.

Multiplying the tonnage of fertilizers consumed by its average potash content, the total consumption of potash was as follows in recent years:

Year:	*Tons*	Year:	*Tons*
1934	262,600	1938	394,500
1935	301,600	1939	404,700
1936	347,100	1940	427,300
1937	415,600	1941	461,000

These figures are of the same order but differ somewhat from those in table 11, which are based principally on reports of deliveries by the American Potash Institute.

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APPENDIX

Tables 17 to 24

TABLE 17.—*Tonnage and proportion of fertilizer consumed [1] in spring and fall seasons of 1941, by certain regions and States*

Region and State	Spring		Fall	
	Tons	*Percent*	*Tons*	*Percent*
New England	265,742	83.62	52,055	16.38
Middle Atlantic [2]	627,000	76.23	195,500	23.77
New Jersey	175,000	95.11	9,000	4.89
Pennsylvania	272,000	72.34	104,000	27.66
Delaware	20,500	59.42	14,000	40.58
Maryland	110,000	63.95	62,000	36.05
West Virginia	49,500	88.39	6,500	11.61
South Atlantic	2,975,126	84.23	557,039	15.77
Virginia	320,000	80.00	80,000	20.00
North Carolina	899,975	87.22	131,853	12.78
South Carolina	631,641	93.33	45,170	6.67
Georgia	760,000	94.29	46,000	5.71
Florida	363,510	58.87	254,016	41.13
East North Central [2]	554,335	61.87	341,593	38.13
Ohio	221,854	56.50	170,823	43.50
Indiana	168,704	61.71	104,682	38.29
Illinois [3]	42,872	70.42	18,006	29.58
Michigan	120,905	71.55	48,082	28.45
West North Central [2]	43,568	49.40	44,618	50.60
Missouri	38,000	55.07	31,000	44.93
Kansas	5,568	29.02	13,618	70.98
South Central	1,472,938	88.21	196,830	11.79
Kentucky	92,000	79.31	24,000	20.69
Tennessee	120,000	84.81	21,500	15.19
Alabama	560,850	96.45	20,650	3.55
Mississippi	314,792	85.39	53,875	14.61
Arkansas	112,000	89.98	12,475	10.02
Louisiana	147,360	80.96	34,650	19.04
Oklahoma	8,875	68.53	4,075	31.47
Texas	117,061	82.05	25,605	17.95
California	141,378	53.34	123,665	46.66
All other	435,516	75.67	140,000	24.33
Continental United States	6,515,603	79.78	1,651,300	20.22

[1] Excluding that distributed by the Government.
[2] Only those listed herewith. Other States of this section are included with "All other."
[3] Excluding raw phosphate rock.

TABLE 18.—*Tonnage and proportion, by months, of total consumption for certain States, as indicated by tax-tag sales, 1941*

TONNAGES

State	January	February	March	April	May	June	July	August	September	October	November	December	1941
Virginia	32,650	64,519	74,304	88,746	28,848	9,246	7,933	11,832	44,116	21,745	9,300	6,138	399,377
North Carolina	107,548	146,582	310,558	350,187	52,400	20,176	4,350	3,850	19,222	25,088	39,079	71,303	1,150,343
South Carolina	50,102	119,936	265,216	169,509	39,194	17,352	5,898	5,340	5,040	6,875	13,860	31,125	729,447
Georgia	45,082	124,820	343,482	209,988	11,500	7,224	1,783	2,242	5,513	12,740	13,992	27,960	806,326
Florida	81,094	69,294	53,517	47,986	53,654	28,714	31,594	34,998	32,665	66,533	70,187	84,428	654,664
Alabama	42,900	82,000	146,950	255,100	28,000	5,900	2,050	300	1,800	6,750	1,650	8,100	581,500
Mississippi	63,250	69,689	70,313	90,785	11,005	9,750	1,600	5,550	1,675	9,175	22,675	13,200	368,667
Tennessee	7,658	21,950	10,410	67,645	11,608	1,648	1,331	4,725	1,363	12,103	910	110	141,461
Arkansas	28,550	18,450	25,800	31,400	7,050	750	500	250	350	1,100	225	10,050	124,475
Louisiana	38,950	22,150	37,830	41,300	5,350	1,780	50	1,500	11,600	4,000	10,300	7,200	182,010
Texas	20,360	22,620	26,817	37,295	8,855	1,114	415	655	11,095	2,075	4,275	7,090	142,666
Oklahoma	2,500	3,186	2,110	841	118	120	505	420	800	350	0	2,000	12,950
Indiana	7,761	62,847	65,079	24,622	40,233	35,354	7,630	56,072	32,939	2,323	1,250	4,051	340,161
Illinois	923	3,225	16,881	9,299	16,148	75	450	5,445	7,162	1,947	1,012	437	63,004
Kentucky	6,088	19,313	20,348	31,038	16,847	4,325	352	6,566	9,235	7,864	0	0	121,976
Missouri	7,016	6,797	16,670	5,048	752	20	1,768	32,429	15,539	695	115	115	86,964
Kansas	3,340	877	816	400	135	0	30	8,263	3,925	1,225	0	175	19,186
Total	545,772	858,255	1,487,101	1,461,189	331,697	143,548	68,239	180,437	204,039	182,588	188,830	273,482	5,925,177

PERCENTAGE OF THE TOTAL

State	January	February	March	April	May	June	July	August	September	October	November	December	1941
Virginia	8.18	16.15	18.60	22.22	7.22	2.32	1.99	2.96	11.05	5.44	2.33	1.54	100.00
North Carolina	9.35	12.74	27.00	30.44	4.56	1.75	.38	.33	1.67	2.18	3.40	6.20	100.00
South Carolina	6.87	16.44	36.35	23.24	5.37	2.38	.81	.73	.69	.94	1.90	4.28	100.00
Georgia	5.59	15.48	42.60	26.04	1.43	.89	.22	.28	.68	1.58	1.74	3.47	100.00
Florida	12.39	10.58	8.17	7.33	8.20	4.39	4.83	5.35	4.99	10.16	10.72	12.89	100.00
Alabama	7.38	14.10	25.27	43.87	4.82	1.01	.35	.05	.31	1.16	.28	1.40	100.00
Mississippi	17.16	18.90	19.07	24.63	2.99	2.64	.43	1.51	.45	2.49	6.15	3.58	100.00
Tennessee	5.41	15.52	7.36	47.81	8.21	1.16	.94	3.34	.96	8.56	.64	.09	100.00
Arkansas	22.94	14.83	20.73	25.23	5.66	.60	.40	.20	.28	.88	.18	8.07	100.00
Louisiana	21.40	12.17	20.78	22.69	2.94	.98	.03	.82	6.37	2.20	5.66	3.96	100.00
Texas	14.27	15.86	18.80	26.13	6.21	.78	.29	.46	7.78	1.45	3.00	4.97	100.00
Oklahoma	19.31	24.60	16.29	6.49	.91	.93	3.90	3.24	6.18	2.70	0	15.45	100.00
Indiana	2.28	18.48	19.14	7.24	11.83	10.39	2.24	16.48	9.68	.68	.37	1.19	100.00
Illinois	1.46	5.12	26.80	14.76	25.63	.12	.71	8.64	11.37	3.09	1.61	.69	100.00
Kentucky	4.99	15.83	16.68	25.45	13.81	3.55	.29	5.38	7.57	6.45	0	0	100.00
Missouri	8.07	7.82	19.17	5.80	.86	.02	2.03	37.30	17.87	.80	.13	.13	100.00
Kansas	17.41	4.57	4.25	2.09	.70	0	.16	43.07	20.46	6.38	0	.91	100.00
Average	9.21	14.48	25.10	24.66	5.60	2.42	1.15	3.05	3.44	3.08	3.19	4.62	100.00

TABLE 19.—*Proportion, by months, of total fertilizer consumption for certain States and New England, as indicated by shipments from fertilizer mixers, 1941*

PERCENT

Region or State	January	February	March	April	May	June	July	August	September	October	November	December
New England	6.45	8.15	16.05	25.26	24.45	3.26	0.72	1.45	4.80	3.05	1.64	4.72
New Jersey	7.35	4.32	10.10	21.09	16.23	8.73	2.91	3.06	9.20	5.83	4.92	6.26
Maryland	5.51	7.26	13.85	22.38	17.57	7.28	1.17	3.64	10.77	6.52	2.46	1.59
Virginia	6.27	10.11	18.64	26.65	9.53	5.96	4.22	2.29	5.65	5.48	2.19	3.01
North Carolina	6.58	10.86	27.56	27.47	9.17	4.05	1.51	1.64	1.91	3.44	1.91	3.90
South Carolina	6.81	11.80	24.55	21.83	7.69	4.83	3.05	.79	3.10	7.60	5.31	2.56
Georgia	8.74	12.39	35.10	10.34	3.85	4.83	5.78	.38	2.36	2.87	5.42	7.94
Florida	12.43	10.71	9.79	6.91	8.76	7.67	2.98	2.83	4.18	7.95	11.86	13.93
Alabama [1]	6.71	12.18	26.70	17.45	1.81	2.09	6.10	2.74	4.77	8.79	6.78	3.88
Arizona [2]	8.48	14.63	11.81	2.51	1.85	2.31	1.16	9.69	14.48	17.85	11.60	3.63
Weighted average of above, except Arizona	7.65	10.71	23.20	19.49	9.07	4.87	3.37	1.76	3.93	5.45	4.88	5.60

[1] Data for 2 plants only.
[2] 1940 data. Not included in average.

TABLE 20.—*Percentages* [1] *of various classes of fertilizers, in certain States, for 1934, 1939, and 1941*

State	Year	Complete mixtures	P-K mixtures	All mixtures	Chemical nitrogenous material	Superphosphates	All separate materials
Maine	1934	89.03	0.00	89.03	3.09	3.09	10.97
	1939	94.35	.04	96.33	.72	1.38	3.67
	1941	82.33	.03	82.36	.46	13.66	17.64
New Hampshire	1934	72.06	.03	72.13	6.50	6.71	27.87
	1939	69.77	.55	70.33	5.95	11.35	29.67
	1941	27.46	.15	27.61	4.21	65.22	72.39
Vermont	1934	74.03	.09	74.13	4.48	17.83	25.87
	1939	62.04	1.35	63.39	3.21	30.35	36.61
	1941	12.05	.26	12.31	1.09	85.97	87.69
Massachusetts	1934	69.84	.02	69.87	7.26	8.92	30.13
	1939	64.90	.15	65.05	7.84	11.81	34.95
	1941	55.98	.15	57.82	5.89	24.70	42.18
Rhode Island	1934	81.41	.05	81.46	5.47	6.28	18.54
	1939	78.78	.09	78.86	5.62	6.31	21.14
	1941	61.72	.45	65.11	3.35	27.37	34.89
Connecticut	1934	62.09	.08	62.87	4.90	7.95	37.13
	1939	45.25	.12	53.11	4.93	10.29	46.89
	1941	41.70	.48	46.23	2.22	19.63	53.77
New York	1934	76.19	.45	77.10	5.04	14.29	22.90
	1939	56.53	.45	56.98	3.36	36.16	43.02
	1941	46.86	.51	47.37	3.05	46.78	52.63
New Jersey	1934	85.77	.08	86.72	4.49	2.83	13.28
	1939	85.12	.37	85.91	3.29	5.19	14.09
	1941	87.81	1.38	89.39	3.46	4.21	10.61
Pennsylvania	1934	71.38	3.11	74.88	2.06	18.43	25.12
	1939	70.10	3.23	73.34	.88	22.41	26.66
	1941	64.43	2.91	67.46	.89	26.77	32.54
Delaware	1934	63.56	17.42	81.98	2.02	12.52	18.02
	1939	78.23	12.30	90.53	1.85	5.42	9.47
	1941	74.69	12.16	86.88	1.77	10.00	13.12
Maryland	1934	74.39	6.28	79.29	3.88	11.46	20.71
	1939	80.18	9.13	89.31	1.50	7.07	10.69
	1941	78.67	6.24	84.93	4.00	9.17	15.07
West Virginia	1934	49.67	1.44	51.64	5.08	39.37	48.36
	1939	64.81	1.54	66.35	1.75	29.16	33.65
	1941	38.42	1.05	39.47	2.64	49.55	60.53
Virginia	1934	61.79	3.72	71.16	3.56	17.87	28.84
	1939	70.38	6.06	76.83	4.79	9.35	23.17
	1941	57.24	7.06	65.38	4.97	19.79	34.62
North Carolina	1934	73.50	1.30	77.34	10.87	7.21	22.66
	1939	79.97	1.71	82.70	10.16	4.39	17.30
	1941	74.22	2.00	78.42	11.65	6.08	21.58
South Carolina	1934	73.03	.31	74.64	14.14	6.59	25.36
	1939	64.82	.14	65.56	19.85	6.84	34.44
	1941	59.72	.12	63.79	20.98	7.21	36.21
Georgia	1934	80.51	.47	81.21	12.13	.4.34	18.79
	1939	72.68	.86	74.52	14.37	6.23	25.48
	1941	64.53	1.01	67.16	16.23	12.01	32.84
Florida	1934	76.11	.93	79.83	7.90	2.65	20.17
	1939	66.60	3.29	72.88	4.33	2.13	27.12
	1941	78.99	3.90	82.88	4.06	2.03	17.12
Alabama	1934	69.58	.58	70.36	15.45	12.40	29.64
	1939	63.02	.62	63.72	20.95	13.62	36.28
	1941	55.39	.08	55.96	20.06	20.29	44.04
Mississippi	1934	66.37	0	66.37	20.43	11.31	33.63
	1939	47.82	.14	48.46	39.52	8.81	51.54
	1941	38.51	.06	38.99	50.70	8.32	61.01
Tennessee	1934	45.40	20.98	66.38	4.20	26.69	33.62
	1939	47.49	19.73	67.24	7.08	23.42	32.76
	1941	27.33	12.47	39.81	6.29	50.88	60.19
Missouri	1934	55.29	1.28	57.78	2.64	34.60	42.22
	1939	51.63	3.33	55.25	.97	37.09	44.75
	1941	42.46	2.94	45.45	.82	48.07	54.55
Arkansas	1934	80.96	.04	81.02	8.80	7.31	18.95
	1939	50.41	.01	50.67	16.97	3.19	49.33
	1941	43.96	.10	44.22	26.24	14.63	55.78

See footnote at end of table.

TABLE 20.—*Percentages of various classes of fertilizers, in certain States, for 1934, 1939, and 1941*—Continued

State	Year	Complete mixtures	P-K mixtures	All mixtures	Chemical nitrogenous material	Superphosphates	All separate materials
Louisiana	1934	60.28	5.90	66.71	16.27	13.41	33.29
	1939	48.45	6.58	58.33	31.27	4.12	41.67
	1941	47.57	5.14	54.76	26.33	4.62	45.24
Texas	1934	74.61	.07	77.80	4.52	16.16	22.20
	1939	73.70	.12	80.51	5.06	8.25	19.49
	1941	73.50	.41	79.99	5.72	9.32	20.01
Oklahoma	1934	81.78	0	81.78	1.34	16.02	18.22
	1939	78.46	0	78.48	2.88	11.46	21.52
	1941	73.53	.05	73.66	3.76	13.16	26.34
Ohio	1934	63.00	5.72	68.74	1.22	28.57	31.26
	1939	74.66	9.95	84.63	2.54	10.71	15.37
	1941	75.43	10.18	85.63	2.58	10.36	14.37
Indiana	1934	71.74	13.67	85.53	.62	12.26	14.47
	1939	66.87	21.77	88.65	1.23	6.44	11.35
	1941	61.73	23.87	85.65	2.48	7.74	14.35
Illinois	1934	21.25	9.82	31.18	5.14	6.65	68.82
	1939	26.25	9.05	35.30	2.05	4.10	64.70
	1941	24.98	9.72	34.72	3.95	9.84	65.28
Kentucky	1934	49.21	8.95	59.19	1.61	38.71	40.81
	1939	47.84	5.19	54.34	1.38	43.73	45.66
	1941	20.85	1.87	23.14	.67	74.39	76.86
Michigan	1934	76.79	5.34	82.13	3.40	13.19	17.87
	1939	77.42	8.15	85.57	2.15	10.22	14.43
	1941	67.13	8.53	75.86	3.17	19.63	24.14
Wisconsin	1934	69.18	13.66	82.85	2.78	11.00	17.15
	1939	66.20	17.96	84.16	1.56	8.18	15.84
	1941	51.31	17.87	69.17	1.18	23.68	30.83
Minnesota	1934	33.27	44.54	77.81	.67	18.66	22.19
	1939	52.77	21.98	75.16	2.28	15.15	24.84
	1941	32.34	11.15	43.65	1.49	50.33	56.35
Iowa	1934	37.17	21.39	58.55	1.25	38.90	41.45
	1939	46.29	11.66	57.95	.89	25.87	42.05
	1941	39.64	12.43	52.06	2.38	39.99	47.94
Kansas	1934	44.73	0	47.80	1.80	43.41	52.20
	1939	26.52	.30	28.61	2.26	59.47	71.39
	1941	21.61	.29	23.37	1.04	72.42	76.63
Arizona	1934	.67	0	.67	38.26	60.40	99.33
	1939	6.20	0	38.67	25.45	28.58	61.33
	1941	5.48	0	19.69	31.62	41.90	80.31
California	1934	16.87	1.00	18.34	30.81	3.79	81.66
	1939	27.86	2.01	30.95	44.40	6.76	69.05
	1941	31.11	.57	33.18	36.86	6.28	66.82
Oregon	1934	37.04	.36	38.22	20.71	12.87	61.78
	1939	27.66	0	27.66	9.13	37.94	72.34
	1941	43.41	0	43.41	13.72	32.81	56.59
Washington	1934	36.59	0	40.00	20.95	10.72	60.00
	1939	34.37	0	34.37	8.73	34.62	65.63
	1941	25.81	0	25.81	18.58	33.47	74.19
Continental United States	1934	70.44	2.56	74.12	9.38	11.08	25.88
	1939	66.58	3.67	71.13	11.24	10.89	28.87
	1941	56.60	3.33	62.89	11.20	18.11	37.11

[1] The large increase in superphosphate percentages with consequent decrease in others is caused primarily by the large tonnages distributed by the Government in 1941.

TABLE 21.—*Principal grades of mixed fertilizers consumed in the continental United States*

Grade	Rank			States [1] using in 1941	1941	Percentage of total	
	1941	1939	1934		Total consumption	Actual	Cumulative
				Number	*Tons*		
2-12-6	1	2	4	21	573,239	10.62	10.62
4-8-4	2	3	2	25	458,064	8.48	19.10
3-8-5	3	1	3	13	442,439	8.19	27.29
4-8-6	4	6	19	20	242,726	4.50	31.79
3-8-3	5	4	1	4	214,912	3.98	35.77
5-7-5	6	7	8	7	160,889	2.98	38.75
6-8-4	7	5	168	20	155,581	2.88	41.63
4-8-8	8	9	26	22	143,049	2.65	44.28
3-12-6	9	17	38	16	105,431	1.95	46.23
4-12-4	10	12	14	29	101,171	1.87	48.10
3-10-6	11	13	50	15	96,636	1.79	49.89
2-10-4	12	24	32	10	93,704	1.74	51.63
3-8-8	13	16	43	8	82,020	1.52	53.15
2-10-6	14	26	103	7	78,621	1.46	54.61
3-8-6	15	8	27	13	74,509	1.38	55.99
4-7-5	16	25	31	6	74,073	1.37	57.36
5-10-5	17	22	30	22	72,051	1.33	58.69
4-10-7	18	33	45	6	66,688	1.24	59.93
0-12-12	19	44	67	18	63,220	1.17	61.10
0-14-6	20	30	66	13	61,914	1.15	62.25
2-9-3	21	31	9	6	60,389	1.12	63.37
2-8-10	22	14	15	15	59,222	1.10	64.47
4-8-10	23	21	17	22	58,179	1.08	65.55
2-9-5	24	11	22	11	55,288	1.02	66.57
4-10-6	25	39	74	17	52,452	.97	67.54
3-9-5	26	35	25	4	52,218	.97	
6-6-5	27	10	11	14	49,499	.92	
3-10-3	28	37	16	11	48,704	.90	
3-9-3	29	27	6	2	47,557	.88	
5-8-7	30	19	13	15	43,668	.81	72.02
6-8-6	31	62	91	14	43,035	.80	
5-10-10	32	50	120	16	41,340	.77	
4-10-4	33	29	10	24	40,412	.75	
3-12-12	34	49	86	12	40,376	.75	
4-16-4	35	36	34	21	36,300	.67	75.76
2-12-4	36	15	20	11	35,042	.65	
4-8-3	37	28	51	5	32,677	.61	
5-8-10	38	38	49	14	32,217	.60	
5-8-12	39	40	41	4	31,908	.59	
2-12-2	40	20	7	14	29,869	.55	78.76
2-8-4	41	32	44	6	29,732	.55	
4-8-7	42	18	5	20	28,677	.53	
10-0-10	43	61	>175	9	28,369	.53	
6-10-7	44	60	60	5	28,023	.52	
6-8-8	45	58	166	12	27,756	.51	81.40
3-18-9	46	69	>175	11	27,680	.51	
4-8-12	47	54	71	12	25,862	.48	
3-8-10	48	45	49	12	25,254	.47	
8-16-20	49	47	55	7	25,129	.47	
4-8-5	50	34	18	12	23,415	.43	83.76

See footnotes at end of table.

TABLE 21.—*Principal grades of mixed fertilizers consumed in the continental United States*—Continued

Grade	Rank			States using in 1941	1941	Percentage of total	
	1941	1939	1934		Total consumption	Actual	Cumulative
				Number	*Tons*		
5-8-5	51	42	24	11	19,797	0.37	
8-16-16	52	63	78	13	19,752	.37	
0-20-20	53	66	129	19	[2] 19,525	.36	
4-5-5	54	52	>175	1	19,476	.36	
4-12-8	55	82	159	12	18,319	.34	85.56
2-16-8	56	56	83	11	18,148	.34	
6-12-6	57	53	65	11	17,643	.33	
0-10-10	58	41	47	13	17,544	.32	
4-24-12	59	55	87	8	17,258	.32	
2-8-16	60	59	48	6	16,398	.30	87.17
10-6-16	61	48	36	1	16,328	.30	
0-8-24	62	68	88	6	16,309	.30	
10-6-4	63	79	165	22	15,902	.29	
3-9-18	64	75	108	9	15,618	.29	
0-10-4	65	23	21	6	14,224	.26	88.61
4-6-8	66	84	73	4	14,134	.26	
3-10-10	67	57	121	7	13,095	.24	
0-12-4	68	67	69	7	12,528	.23	
14-6-10	69	74	118	1	12,036	.22	
5-7-7	70	51	82	5	11,737	.22	89.78
12-6-12	71	81	98	1	11,102	.21	
6-7-8	72	86	53	1	10,947	.20	
14-4-10	73	65	42	1	10,801	.20	
0-20-10	74	96	>175	12	10,732	.20	
4-9-3	75	>173	>175	5	10,066	.19	90.78
3-6-8	76	71	101	1	9,889	.18	
3-14-6	77	87	>175	5	9,645	.18	
0-12-5	78	43	28	6	9,486	.17	
3-9-7	79	98	132	2	9,242	.17	
13-5-10	80	78	61	1	8,961	.17	91.65
0-10-6	81	80	>175	6	8,220	.15	
8-16-14	82	72	63	8	8,071	.15	
2-12-12	83	114	>175	7	7,703	.14	
4-10-8	84	64	>175	7	7,575	.14	
3-12-15	85	140	>175	5	7,520	.14	92.37
7-7-7	86	107	>175	15	7,347	.14	
2-10-2	87	46	23	4	6,588	.12	
5-5-5	88	85	35	5	6,422	.12	
5-8-6	89	>173	>175	10	6,158	.11	
4-6-5	90	89	89	2	6,072	.11	92.97
4-7-3	91	92	>175	1	6,040	.11	
2-7-5	92	>173	>175	1	5,917	.11	
3-10-5	93	76	64	5	5,906	.11	
7-8-10	94	164	>175	2	5,899	.11	
6-3-6	95	101	131	3	5,797	.11	93.52
0-9-27	96	103	84	6	5,542	.10	
6-7-7	97	93	>175	4	5,065	.09	
31 grades, 3,000–4,999 tons each					118,724	2.23	95.94
63 grades, 1,000–2,999 tons each					104,315	1.86	97.85
460 grades, 1–999 tons each					77,603	1.44	99.29
Miscellaneous, grade unspecified					38,415	.71	
Total reported by 34 States					5,398,727	100.00	100.00
Consumption in all other States					290,156		
Grand total for the United States					5,688,883		

[1] Detailed figures on consumption by grades were given by 34 States for 651 different grades altogether.
[2] Includes 5,170 tons distributed by A. A. A.

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico,*[1] *1941*

ALABAMA (Ala. Dept. Agr. and Ind., 1940–41)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
6-8-4	1	125,600	36.52	36.52
3-8-5	2	101,600	29.54	66.06
4-10-7	3	60,200	17.51	83.57
4-8-4	4	27,000	7.85	91.42
4-10-4	5	8,700	2.53	93.95
3-10-3	6	5,400	1.57	95.52
0-12-6	7	3,000	.87	96.39
Unspecified		12,400	3.61	100.00

ARKANSAS (Ark. Dept. Rev., 1940–41)

4-8-6	1	24,938	43.72	43.76
4-8-4	2	8,074	14.16	57.88
4-12-4	3	5,815	10.19	68.07
6-8-12	4	4,582	8.03	76.10
3-10-3	5	4,029	7.06	83.16
3-9-18	6	2,272	3.98	87.14
6-8-4	7	2,022	3.55	90.69
6-8-8	8	1,570	2.75	93.44
4-8-10	9	1,083	1.90	95.34
6-12-6	10	1,069	1.88	97.22
8 other grades		1,582	2.78	100.00

CONNECTICUT (Conn. Agr. Expt. Sta. Bul. 453, 1940–41)

5-8-7	1	9,030	27.90	27.90
6-3-6	2	3,061	9.46	37.36
4-8-4	3	1,923	5.94	43.30
7-7-7	4	1,305	4.03	47.33
6-3-7	5	1,092	3.37	50.70
8-16-16	6	992	3.06	53.76
5-5-15	7	673	2.08	55.84
58 other grades		11,699	36.14	91.98
Special mixtures		2,596	8.02	100.00

FLORIDA (Fla. Dept. Agr. Fert. Statis. Div., 1941) [2]

4-7-5	1	44,474	10.57	10.57
3-8-8	2	29,413	6.99	17.56
4-8-8	3	29,333	6.97	24.53
4-8-6	4	19,632	4.67	29.20
4-5-5	5	19,476	4.63	33.83
4-8-3	6	16,898	4.01	37.84
3-8-5	7	16,881	4.01	41.85
4-6-8	8	14,004	3.33	45.18
3-6-8	9	9,889	2.35	47.53
5-7-5	10	9,574	2.28	49.81
4-8-5	11	8,531	2.03	51.84
3-8-10	12	6,089	1.45	53.29
4-6-5	13	6,068	1.44	54.73
4-7-3	14	6,040	1.44	56.17
5-5-5	15	5,428	1.29	57.46
4-8-10	16	5,366	1.28	58.74
4-8-4	17	3,787	.90	59.74
4-10-7	18	2,618	.62	60.26
4-6-10	19	2,066	.49	60.75
2-8-10	20	2,046	.49	61.24
5-8-8	21	1,134	.27	61.51
3-8-6	22	1,065	.25	61.76
2-9-4	23	1,009	.24	62.00
Grades containing over 25 units of plant nutrients		31,111	7.39	69.39
N-K grades		24,081	5.72	75.11
Grades containing less than 14 units of plant nutrients		1,952	.46	75.57
More than 200 other grades		102,837	24.43	100.00

[1] For source of information and period covered, see State headings. In the case of States not included, either no State grade reports were available or they were unsatisfactory for use in this table. For example, the California reports, as well as several others, itemize the materials sold separately but not the different grades of mixed fertilizers.

[2] The total tonnage itemized in the report is stated to be only 82 percent of the actual consumption.

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

GEORGIA (Ga. Dept. Agr., 1941–42)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
4–8–6	1	132,999	19.10	19.10
4–8–4	2	120,369	17.29	36.39
2–10–4	3	52,624	7.56	43.95
3–9–5	4	52,042	7.47	51.42
5–7–5	5	50,640	7.27	58.69
3–8–5	6	47,713	6.85	65.54
3–9–3	7	46,591	6.69	72.23
2–9–3	8	39,610	5.69	77.92
3–8–8	9	27,010	3.88	81.80
4–8–8	10	14,963	2.15	83.95
6–8–6	11	10,401	1.49	85.44
10–0–10	12	9,697	1.39	86.83
4–10–4	13	7,887	1.13	87.96
4–12–4	14	7,609	1.09	89.05
2–7–5	15	5,917	.85	89.90
2–10–2	16	5,336	.77	90.67
0–12–4	17	5,289	.76	91.43
3–8–6	18	4,982	.72	92.15
6–8–8	19	4,851	.70	92.85
4–10–6	20	4,383	.64	93.49
103 other grades		45,330	6.51	100.00

ILLINOIS (Univ. of Ill. Dept. Agron., 1941)

2–12–6	1	14,191	29.55	29.55
0–12–12	2	5,756	11.98	41.53
3–12–12	3	5,079	10.57	52.10
0–8–24	4	3,055	6.36	58.46
2–8–16	5	2,740	5.70	64.16
2–16–8	6	2,265	4.72	68.88
4–8–6	7	1,876	3.91	72.79
4–16–4	8	1,364	2.84	75.63
0–16–6	9	1,219	2.54	78.17
10–6–4	10	1,021	2.13	80.30
0–14–6	11	807	1.68	81.98
3–14–6	12	725	1.51	83.49
2–12–2	13	697	1.45	84.94
2–18–6	14	673	1.40	86.34
4–8–7	15	566	1.18	87.52
47 other grades		5,997	12.48	100.00

INDIANA (Purdue Agr. Expt. Sta. Cir. 275, 1941)

2–12–6	1	95,364	45.20	45.20
0–12–12	2	31,090	14.73	59.93
0–14–6	3	11,382	5.40	65.33
0–8–24	4	8,724	4.14	69.47
3–12–12	5	8,405	3.98	73.45
0–20–20	6	7,085	3.36	76.81
2–12–12	7	6,481	3.07	79.88
2–8–16	8	5,185	2.46	82.34
4–24–12	9	4,528	2.15	84.49
3–18–9	10	4,146	1.97	86.46
0–10–10	11	2,957	1.40	87.86
3–9–18	12	2,908	1.38	89.24
2–16–8	13	2,504	1.19	90.43
0–21–9	14	2,343	1.12	91.55
2–12–20	15	2,145	1.02	92.57
90 other grades		14,548	7.43	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

IOWA (Iowa State Col. Dept. Agron., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
2-12-6	1	4,845	40.32	40.32
3-14-6	2	1,757	14.62	54.94
0-9-27	3	1,022	8.51	63.45
0-12-12	4	877	7.30	70.75
2-8-16	5	734	6.11	76.86
3-12-12	6	511	4.25	81.11
2-12-2	7	350	2.91	84.02
2-16-8	8	299	2.49	86.51
0-14-14	9	281	2.34	88.85
0-20-10	10	264	2.20	91.05
35 other grades		1,076	8.95	100.00

KENTUCKY (Univ. of Ky. Agr. Expt. Sta. Regulat. Ser. Bul. 30, 1941)

3-8-6	1	16,234	23.76	23.76
2-8-4	2	11,048	16.17	39.93
3-10-3	3	7,735	11.32	51.25
0-10-4	4	4,386	6.42	57.67
4-12-8	5	3,882	5.68	63.35
4-8-4	6	3,304	4.84	68.19
6-8-6	7	3,232	4.73	72.92
2-10-4	8	2,462	3.60	76.52
4-10-6	9	2,272	3.33	79.85
2-12-6	10	2,176	3.18	83.03
3-8-5	11	1,796	2.63	85.66
5-10-5	12	1,620	2.37	88.03
4-12-0	13	1,230	1.80	89.83
4-10-4	14	878	1.29	91.12
23 other grades		5,274	7.72	98.84
Miscellaneous		790	1.16	100.00

LOUISIANA (Dept. Agr. and Immig., 1940–41)

4-8-4	1	26,621	31.38	31.38
6-10-7	2	9,430	11.12	42.50
4-12-4	3	8,549	10.07	52.57
6-8-4	4	8,413	9.92	62.49
3-10-3	5	6,638	7.82	70.31
0-12-4	6	6,369	7.51	77.82
3-10-5	7	3,903	4.60	82.42
4-10-7	8	2,952	3.48	85.90
12-8-0	9	2,477	2.92	88.82
6-8-8	10	1,913	2.26	91.08
0-14-10	11	1,708	2.01	93.09
4-8-6	12	1,401	1.65	94.74
21 other grades		4,461	5.26	100.00

MAINE (Univ. of Maine Dept. Agron., 1940)

5-8-12	1	28,206	21.87	21.87
8-16-20	2	23,632	18.33	40.20
5-8-10	3	23,125	17.93	58.13
4-8-10	4	9,364	7.26	65.39
8-16-14	5	6,363	4.93	70.32
8-16-16	6	6,106	4.74	75.06
5-9-8	7	3,508	2.72	77.78
7-13-16	8	3,000	2.33	80.11
6-10-14	9	2,962	2.30	82.41
5-10-10	10	2,912	2.26	84.67
5-8-7	11	2,673	2.07	86.74
10-16-24	12	2,200	1.71	88.45
4-8-4	13	1,726	1.34	89.79
7-14-21	14	1,724	1.33	91.12
49 other grades		11,447	8.88	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

MARYLAND (Md. Insp. and Regulat. Serv., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
2-12-6	1	28,129	19.12	19.12
2-9-5	2	19,679	13.38	32.50
3-12-6	3	11,414	7.76	40.26
2-8-10	4	9,668	6.57	46.83
6-6-5	5	8,899	6.05	52.88
4-8-8	6	6,799	4.62	57.50
4-8-12	7	6,778	4.61	62.11
6-8-6	8	5,757	3.91	66.02
4-8-10	9	5,438	3.70	69.72
0-14-6	10	3,681	2.50	72.22
5-8-12	11	3,616	2.46	74.68
0-10-10	12	3,453	2.35	77.03
3-8-10	13	3,081	2.09	79.12
3-8-15	14	2,954	2.01	81.13
5-10-5	15	2,729	1.86	82.99
4-8-7	16	2,647	1.80	84.79
0-12-5	17	1,628	1.10	85.89
0-12-12	18	1,432	.97	86.86
4-8-5	19	1,317	.89	87.75
3-18-9	20	1,266	.86	88.61
4-12-4	21	1,061	.72	89.33
68 other grades	----------	10,807	7.35	96.68
Mixed to order	----------	4,871	3.32	100.00

MASSACHUSETTS (Mass. Agr. Expt. Sta. Bul. 109, 1940–41)

5-8-7	1	11,941	25.84	25.84
4-8-4	2	3,754	8.12	33.96
6-3-6	3	2,733	5.91	39.87
7-7-7	4	2,692	5.83	45.70
5-10-10	5	2,333	5.05	50.75
4-8-10	6	2,285	4.94	55.69
4-8-7	7	2,234	4.83	60.52
8-16-16	8	1,986	4.30	64.82
5-8-10	9	1,663	3.60	68.42
5-10-5	10	1,401	3.03	71.45
6-3-7	11	994	2.15	73.60
4-12-4	12	968	2.10	75.70
5-6-4	13	636	1.38	77.08
5-5-15	14	610	1.32	78.40
7-6-6	15	572	1.24	79.64
3-10-4	16	542	1.17	80.81
10-10-10	17	486	1.05	81.86
8-16-14	18	433	.94	82.80
8-16-20	19	426	.92	83.72
3-10-6	20	421	.91	84.63
4-16-20	21	402	.87	85.50
8-24-8	22	361	.78	86.28
3-12-6	23	306	.66	86.94
41 other grades	----------	4,611	9.98	96.92
Miscellaneous and special mixtures	----------	1,422	3.08	100.00

MICHIGAN (Mich. State Col. Soil Sci. Dept., 1941)

2-12-6	1	75,569	52.42	52.42
2-16-8	2	9,760	6.77	59.19
3-12-12	3	6,902	4.79	63.98
0-20-20	4	4,516	3.13	67.11
2-8-16	5	4,360	3.03	70.14
4-16-4	6	4,259	2.96	73.10
3-9-18	7	4,199	2.91	76.01
0-8-24	8	4,077	2.83	78.84
0-14-6	9	3,476	2.41	81.25
0-12-12	10	3,318	2.30	83.55
10-6-4	11	3,268	2.27	85.82
4-16-8	12	2,976	2.06	87.88
5-10-5	13	2,878	2.00	89.88
2-12-2	14	2,636	1.83	91.71
32 other grades	----------	11,709	8.12	99.83
Custom mixed	----------	250	.17	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

MINNESOTA (Minn. Feed and Fert. Control Div. Fert. Anal. Bul., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
3-14-6	1	3,162	22.32	22.32
0-9-27	2	2,540	17.93	40.25
4-16-4	3	1,385	9.78	50.03
2-12-6	4	1,261	8.90	58.93
3-12-12	5	1,049	7.40	66.33
2-14-14	6	392	2.77	69.10
4-8-6	7	387	2.73	71.83
4-28-8	8	276	1.95	73.78
3-18-9	9	257	1.81	75.59
0-10-20	10	255	1.80	77.39
4-16-8	11	250	1.76	79.15
0-12-12	12	238	1.68	80.83
2-14-4	13	231	1.63	82.46
3-9-18	14	224	1.58	84.04
4-24-12	15	213	1.50	85.54
2-12-2	16	210	1.48	87.02
0-12-36	17	182	1.29	88.31
52 other grades		1,655	11.69	100.00

MISSISSIPPI (Miss. Dept. Agr., 1940-41)

4-8-4	1	84,781	65.14	65.14
6-8-8	2	15,238	11.71	76.85
6-12-6	3	9,698	7.45	84.30
4-8-8	4	8,409	6.46	90.76
6-8-4	5	7,029	5.40	96.16
3-8-5	6	2,660	2.04	98.20
10-0-10	7	1,200	.92	99.12
5 other grades		1,144	.88	100.00

MISSOURI (Mo. Agr. Expt. Sta. Bul. 449, 1941)

2-12-2	1	14,263	40.01	40.01
2-12-6	2	5,264	14.77	54.78
2-12-4	3	2,802	7.86	62.64
4-12-4	4	2,705	7.59	70.23
4-16-4	5	1,792	5.03	75.26
3-9-18	6	1,328	3.73	78.99
0-14-6	7	910	2.55	81.54
4-8-6	8	766	2.15	83.69
2-14-4	9	657	1.84	85.53
4-8-7	10	515	1.44	86.97
0-16-6	11	476	1.33	88.30
0-10-20	12	431	1.21	89.51
3-14-6	13	404	1.13	90.64
31 other grades		3,335	9.36	100.00

NEW HAMPSHIRE (Univ. of N. H. Agron. Dept., 1940-41)

5-8-7	1	1,917	22.63	22.63
4-8-10	2	1,326	15.65	38.28
8-16-16	3	883	10.42	48.70
5-8-10	4	555	6.55	55.25
7-7-7	5	533	6.29	61.54
3-10-6	6	463	5.46	67.00
4-8-4	7	388	4.58	71.58
8-16-14	8	288	3.40	74.98
5-10-10	9	263	3.10	78.08
4-12-4	10	254	3.00	81.08
7-8-5	11	183	2.16	83.24
7-6-6	12	170	2.01	85.25
8-24-8	13	140	1.65	86.90
4-8-7	14	127	1.49	88.39
8-16-20	15	117	1.38	89.77
4-16-20	16	106	1.26	91.03
29 other grades		760	8.97	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

NEW JERSEY (Rutgers Univ. Dept. Agron., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
5-10-10	1	19,509	14.36	14.36
4-8-10	2	19,253	14.17	28.53
5-8-7	3	12,870	9.47	38.00
4-12-8	4	10,772	7.93	45.93
3-12-6	5	10,269	7.56	53.49
5-10-5	6	6,982	5.14	58.63
2-8-10	7	4,726	3.48	62.11
3-12-15	8	4,721	3.48	65.59
4-9-7	9	4,026	2.96	68.55
5-8-10	10	3,506	2.58	71.13
4-10-8	11	3,433	2.53	73.66
3-8-10	12	2,996	2.20	75.86
4-8-8	13	2,924	2.15	78.01
5-8-5	14	2,391	1.76	79.77
10-6-4	15	1,841	1.35	81.12
5-8-8	16	1,688	1.24	82.36
2-12-6	17	1,588	1.17	83.53
6-6-5	18	1,429	1.05	84.58
5-6-5	19	1,326	.98	85.56
0-12-12	20	1,130	.83	86.39
4-8-7	21	1,027	.76	87.15
4-9-8	22	988	.73	87.88
4-12-4	23	970	.71	88.59
4-16-4	24	902	.66	89.25
4-8-5	25	861	.63	89.88
116 other grades	----------	13,752	10.12	100.00

NEW MEXICO (N. Mex. Feed and Fert. Control, 1941)

6-8-4	1	32	39.02	39.02
4-12-4	2	31	37.80	76.82
3-10-2	3	15	18.29	95.11
4-8-4	4	3	3.66	98.77
8-12-2	5	1	1.23	100.00

NEW YORK (N. Y. State Col. Dept. Agron., 1941)

5-10-5	1	43,062	19.30	19.30
4-8-8	2	33,659	15.08	34.38
5-8-5	3	15,552	6.97	41.35
4-12-4	4	14,716	6.59	47.94
4-8-12	5	14,411	6.46	54.40
3-12-6	6	11,467	5.14	59.54
4-8-5	7	10,151	4.55	64.09
2-12-6	8	9,674	4.33	68.42
2-8-10	9	9,130	4.09	72.51
4-16-4	10	7,274	3.26	75.77
5-10-10	11	6,788	3.04	78.81
5-8-6	12	5,571	2.50	81.31
10-20-10	13	3,913	1.75	83.06
8-16-16	14	3,424	1.53	84.59
4-8-6	15	3,232	1.45	86.04
4-16-20	16	2,445	1.10	87.13
5-20-5	17	2,218	.99	88.13
3-12-16	18	1,982	.89	89.02
2-12-4	19	1,936	.87	89.89
4-8-7	20	1,875	.84	90.73
84 other grades	----------	20,032	8.98	----------
Miscellaneous	----------	649	.29	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

NORTH CAROLINA (N. C. Dept. Agr., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
3-8-3	1	191,442	21.93	21.93
3-8-5	2	152,087	17.42	39.35
4-8-4	3	75,647	8.67	48.02
3-10-6	4	66,686	7.64	55.66
2-10-6	5	62,776	7.19	62.85
5-7-5	6	53,524	6.13	68.98
3-8-6	7	35,950	4.12	73.10
4-10-6	8	20,218	2.32	75.42
2-9-3	9	16,201	1.86	77.28
4-8-3	10	14,462	1.66	78.94
2-10-4	11	14,165	1.62	80.56
4-10-4	12	13,194	1.51	82.07
3-8-8	13	13,042	1.49	83.56
10-0-10	14	10,460	1.20	84.76
5-7-7	15	9,684	1.11	85.87
2-8-4	16	9,014	1.03	86.90
6-6-5	17	8,226	.94	87.84
4-9-3	18	8,152	.93	88.77
4-12-4	19	7,934	.91	89.68
3-12-6	20	7,769	.89	90.57
4-7-5	21	7,197	.82	91.39
3-10-10	22	6,567	.75	92.14
3-8-10	23	6,466	.74	92.88
0-10-4	24	6,024	.69	93.57
0-10-6	25	5,809	.67	94.24
4-8-8	26	5,641	.65	94.89
4-8-6	27	3,698	.42	95.31
157 other grades		35,965	4.12	99.43
Customers' mixtures		4,944	.57	100.00

OHIO (Ohio State Univ. Dept. Agron., 1941)

2-12-6	1	211,614	60.60	60.60
0-14-6	2	21,112	6.05	66.65
0-12-12	3	13,802	3.95	70.60
2-8-10	4	12,535	3.59	74.19
3-18-9	5	10,137	2.90	77.09
2-12-2	6	8,765	2.51	79.60
4-24-12	7	8,675	2.48	82.08
3-12-12	8	7,220	2.07	84.15
3-10-6	9	4,377	1.25	85.40
4-10-6	10	3,969	1.14	86.54
2-8-16	11	3,367	.97	87.51
4-12-4	12	3,308	.95	88.46
6-8-6	13	3,082	.88	89.34
4-8-8	14	2,375	.68	90.02
2-16-8	15	2,366	.68	90.70
54 other grades		32,484	9.30	100.00

OKLAHOMA (Okla. Dept. Agr., 1940-41)

4-8-6	1	3,093	55.15	55.15
4-12-4	2	571	10.18	65.33
2-12-6	3	482	8.60	73.93
4-8-4	4	282	5.03	78.96
6-8-4	5	280	4.99	83.95
2-12-2	6	204	3.64	87.59
4-8-10	7	132	2.35	89.94
6-12-6	8	82	1.46	91.40
17 other grades		482	8.60	100.00

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

PENNSYLVANIA (Pa. State Col. Dept. Agron., 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
2-12-6	1	54,512	21.99	21.99
3-12-6	2	46,669	18.83	40.82
2-9-5	3	27,921	11.26	52.08
4-8-8	4	25,782	10.40	62.48
2-8-10	5	12,063	4.87	67.35
2-12-4	6	11,496	4.64	71.99
4-16-4	7	8,430	3.40	75.39
4-12-4	8	6,123	2.47	77.86
5-10-5	9	5,719	2.31	80.17
0-14-6	10	5,548	2.24	82.41
5-10-10	11	4,707	1.90	84.31
4-8-12	12	3,360	1.35	85.66
4-24-12	13	2,949	1.19	86.85
8-16-16	14	2,938	1.18	88.03
4-8-7	15	2,704	1.09	89.12
4-8-10	16	2,174	.88	90.00
95 other grades		24,434	9.86	99.86
Special mixtures		341	.14	100.00

PUERTO RICO (P. R. Dept. Agr. and Com. Ann. Rpt., 1940-41)

10 [3]-6-16	1	16,328	12.89	12.89
14 [3]-6-10	2	12,036	9.50	22.39
12 [3]-6-12	3	11,102	8.77	31.16
6 [3]-7-8	4	10,948	8.64	39.80
14 [3]-4-10	5	10,802	8.53	48.33
13 [3]-5-10	6	8,962	7.08	55.41
7 [3]-8-10	7	5,650	4.46	59.87
10 [3]-10-18	8	4,389	3.47	63.34
14 [3]-6-8	9	4,152	3.28	66.62
12 [3]-6-14	10	3,673	2.90	69.52
14 [3]-8-10	11	3,422	2.70	72.22
10 [3]-7-15	12	3,326	2.63	74.85
14 [3]-8-16	13	3,019	2.38	77.23
12 [3]-6-5	14	1,842	1.45	78.68
14 [3]-6-16	15	1,795	1.42	80.10
7 [3]-10-10	16	1,386	1.09	81.19
12 [3]-6-8	17	1,290	1.02	82.21
12 [3]-10-10	18	1,230	.97	83.18
9 [3]-8-13	19	1,041	.82	84.00
12 [3]-4-15	20	1,037	.82	84.82
85 other grades		12,214	9.64	94.46
Miscellaneous and grade unspecified		7,011	5.54	100.00

RHODE ISLAND (R. I. State Col. Dept. Agron., 1940-41)

5-8-7	1	1,593	20.49	20.49
5-10-10	2	1,114	14.33	34.82
5-8-10	3	971	12.49	47.31
4-8-4	4	775	9.97	57.28
8-6-4	5	462	5.94	63.22
8-16-16	6	402	5.17	68.39
4-8-10	7	350	4.50	72.89
6-12-12	8	343	4.41	77.30
7-7-7	9	266	3.42	80.72
5-10-5	10	183	2.35	83.07
8-24-8	11	143	1.84	84.91
4-12-6	12	126	1.62	86.53
6-14-12	13	124	1.59	88.12
4-16-20	14	91	1.17	89.29
32 other grades		676	8.69	97.98
Miscellaneous		157	2.02	100.00

[3] Percentage of ammonia.

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

SOUTH CAROLINA (Clemson Col. Fert. Dept.,[4] 1941)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
3-8-5	1	93,991	21.60	21.60
4-8-4	2	58,532	13.45	35.05
5-7-5	3	44,840	10.31	45.36
4-8-6	4	32,841	7.55	52.91
4-7-5	5	21,680	4.98	57.89
3-10-3	6	21,143	4.86	62.75
2-10-4	7	20,289	4.66	67.41
4-10-6	8	12,811	2.94	70.35
3-8-8	9	12,017	2.76	73.11
3-8-6	10	11,567	2.66	75.77
3-9-7	11	9,209	2.12	77.89
3-10-6	12	9,109	2.09	79.98
4-10-4	13	8,182	1.88	81.86
4-8-8	14	7,017	1.61	83.47
3-8-10	15	4,209	.97	84.44
10-0-10	16	3,442	.79	85.23
3-10-8	17	3,100	.71	85.94
4-10-5	18	3,079	.71	86.65
4-8-10	19	2,895	.67	87.32
2-10-6	20	2,445	.56	87.88
4-12-4	21	2,405	.55	88.43
4-10-8	22	2,181	.50	88.93
5-10-5	23	1,970	.45	89.38
5-8-3	24	1,821	.42	89.80
3-10-5	25	1,461	.34	90.14
174 other grades		22,130	5.09	95.24
Customers' mixtures		20,711	4.76	100.00

TENNESSEE (Amer. Soc. Agron. Minutes 7th Ann. Meeting, 1940)

0-10-4	1	19,256	28.80	28.80
3-8-6	2	8,584	12.84	41.64
2-10-2	3	5,851	8.75	50.39
3-8-5	4	5,617	8.40	58.79
4-8-4	5	4,957	7.41	66.20
2-10-4	6	4,833	7.23	73.43
4-8-8	7	3,531	5.28	78.71
4-10-4	8	2,678	4.01	82.72
114 other grades		11,550	17.28	100.00

TEXAS (Tex. Agr. Expt. Sta. Bul. 607, 1940-41)

4-8-4	1	34,477	32.30	32.30
4-12-4	2	16,781	15.72	48.02
4-8-6	3	13,085	12.26	60.28
6-10-7	4	8,725	8.17	68.45
6-8-4	5	7,327	6.86	75.31
6-12-6	6	5,483	5.14	80.45
4-10-0	7	4,697	4.40	84.85
3-10-3	8	3,059	2.87	87.72
6-8-8	9	2,527	2.37	90.09
6-9-3	10	2,044	1.91	92.00
3-10-0	11	2,030	1.90	93.90
4-8-10	12	1,456	1.36	95.26
10 other grades		5,061	4.74	100.00

VERMONT (Vt. Agr. Expt. Sta. Bul. 476, 1941)

8-10/16-30/14-20	1	2,671	28.90	28.90
4-8-10	2	1,598	17.29	46.19
4-8-4	3	952	10.30	56.49
3/10-12/3-6	4	876	9.48	65.97
5/8-15/5-10	5	819	8.83	74.80
5-8-7	6	639	6.92	81.72
4-16-20	7	240	2.60	84.32
7-7-7	8	214	2.32	86.64
0-20-20	9	197	2.13	88.77
4-8-7	10	129	1.40	90.17
7 other grades		308	3.33	93.50
Miscellaneous		601	6.50	100.00

[4] About 90 percent complete.

TABLE 22.—*Principal grades of mixed fertilizers consumed in certain States and Puerto Rico, 1941*—Continued

VIRGINIA (Va. Agr. Expt. Sta. Dept. Agron., 1941–42)

Fertilizer grade	Rank	Tonnage	Percentage of total mixed fertilizers	
			Actual	Cumulative
2–12–6	1	42,562	13.36	13.36
6–6–5	2	29,728	9.33	22.69
3–8–5	3	25,427	7.98	30.67
3–8–3	4	23,338	7.32	37.99
6–8–6	5	18,936	5.94	43.93
4–12–4	6	16,440	5.16	49.09
3–12–6	7	14,072	4.42	53.51
0–14–6	8	14,061	4.41	57.92
3–10–6	9	13,740	4.31	62.23
2–12–4	10	13,328	4.18	66.41
2–10–6	11	9,864	3.10	69.51
2–8–4	12	8,857	2.78	72.29
0–12–5	13	5,979	1.88	74.17
4–16–4	14	5,790	1.82	75.99
2–9–5	15	5,271	1.65	77.64
4–8–4	16	5,178	1.62	79.26
9–5–4	17	4,422	1.39	80.65
2–9–3	18	4,303	1.35	82.00
2–10–4	19	3,913	1.23	83.23
0–10–4	20	3,774	1.18	84.41
3–18–9	21	3,573	1.12	85.53
4–10–6	22	3,564	1.12	86.65
2–8–10	23	3,379	1.06	87.71
10–0–10	24	2,777	.87	88.58
0–10–10	25	2,767	.87	89.45
5–10–5	26	2,656	.83	90.28
103 other grades	----------	30,983	9.72	100.00

WEST VIRGINIA (W. Va. State Col. Dept. Agron., 1941)

2–12–6	1	4,725	16.07	16.07
2–12–4	2	4,122	14.02	30.09
4–12–4	3	3,324	11.30	41.39
5–10–10	4	2,492	8.48	49.87
2–8–10	5	2,437	8.29	58.16
3–12–6	6	2,348	7.99	66.15
4–8–8	7	1,934	6.58	72.73
2–9–5	8	1,485	5.05	77.78
4–16–4	9	1,011	3.44	81.22
4–12–10	10	876	2.98	84.20
4–8–7	11	733	2.49	86.69
0–14–6	12	624	2.12	88.81
3–18–9	13	583	1.98	90.79
24 other grades	----------	2,459	8.36	99.15
Miscellaneous	----------	250	.85	100.00

WISCONSIN (Wis. Dept. Agr. Bul. 230, 1941)

2–12–6	1	15,836	25.66	25.66
3–12–12	2	10,941	17.73	43.39
0–20–10	3	7,500	12.15	55.54
3–18–9	4	6,245	10.12	65.66
3–14–6	5	3,597	5.83	71.49
3–9–18	6	3,519	5.70	77.19
0–20–20	7	3,340	5.41	82.60
4–16–4	8	1,726	2.80	85.40
0–9–27	9	1,720	2.79	88.19
0–12–12	10	1,515	2.46	90.65
19 other grades	----------	5,767	9.35	100.00

TABLE 23.—*Consumption*[1] *(in tons) of superphosphate as such, by kind of distribution and by grades, 1941*

State or Territory	Commercial distribution											Government distribution		Total
	14 percent	16 percent	18 percent	19 percent and run-of-pile	20 percent	Total, normal grades	30–32 percent, inclusive [2]	40 percent	43–45 percent, inclusive [3]	46–48 percent, inclusive	Total, concentrated	18–20 percent, inclusive [4]	44–48 percent, inclusive [5]	
Alabama [6]		70,000	15,000		8,800	93,800				10	10	30,920	2,305	127,035
Arizona			305			305			3,325		3,325	474	317	4,421
Arkansas [6]					2,031	2,031	142		20		162	1,911	15,018	19,122
California			7,400		49	7,449			9,000		9,000	85	119	16,653
Colorado									2,800		2,800			2,800
Connecticut [6]		1,000			4,278	5,278				50	50	8,418		13,746
Delaware		500			2,900	3,400		5		20	25	29		3,454
District of Columbia		50			150	200								200
Florida		5,490	1,000		5,000	11,490			157	200	357	701		12,548
Georgia		45,000	11,000		19,000	75,000				10	10	25,093	2,029	102,132
Idaho									6,200		6,200		1,758	7,958
Illinois		175	107		4,343	4,625		1	87		88	8,759	214	13,686
Indiana	30	753	97		12,695	13,575		35	329	46	410	7,721	235	21,941
Iowa			5		3,443	3,448	156		313		469	2,497	3,091	9,505
Kansas		460	347		2,995	3,802			5,420		5,420		3,124	12,346
Kentucky					41,519	41,519			386		386	157,983	20,732	220,620
Louisiana [6]			2,248		2,201	4,449			1		1	720	3,460	8,630
Maine		300			1,500	1,800				300	300	21,618		23,718
Maryland		2,372	215		12,024	14,611				5	5	1,190	75	15,881
Massachusetts [6]		2,327			3,684	6,011		9		35	44	13,683		19,738
Michigan			165		16,454	16,619			235		235	19,656	791	37,301
Minnesota		50			1,555	1,605			3,833		3,833	7,418	3,480	16,336
Mississippi [6]			14,948		5,464	20,412				1	1	6,953	1,254	28,620
Missouri		3,675	1,109		22,547	27,331	157		1,119		1,276	3,650	5,833	38,095
Montana									3,500		3,500			3,500
Nebraska									1,500		1,500			1,500
Nevada									200		200			200
New Hampshire [6]		191			2,026	2,217		23			23	17,625	152	20,017
New Jersey		1,960	906	868	3,974	7,708	50				50			7,758
New Mexico					697	697	74		1,463	33	1,570		172	2,439
New York	1	979	554		127,583	129,117	1,247	30	48	20	1,345	89,271		219,733
North Carolina	653	32,855	556	699	6,751	41,514				36	36	20,009	4,311	65,870
North Dakota									1,700		1,700			1,700
Ohio		1,735	702		[7] 22,684	25,121			257	75	332	16,886	337	42,676
Oklahoma			127		671	798			12		12	192		1,002

See footnotes at end of table.

TABLE 23.—*Consumption (in tons) of superphosphate as such, by kind of distribution and by grades, 1941*—Continued

State or Territory	Commercial distribution											Government distribution		Total
	14 percent	16 percent	18 percent	19 percent and run-of-pile	20 percent	Total, normal grades	30–32 percent, inclusive [2]	40 percent	43–45 percent, inclusive [3]	46–48 percent, inclusive	Total, concentrated	18–20 percent, inclusive [4]	44–48 percent, inclusive [5]	
Oregon			100		1,000	1,100			1,200		1,200	7,621	1,316	11,237
Pennsylvania		7,737	6,573		74,045	88,355	49	5	21	119	194	16,390		104,939
Rhode Island [6]		149			1,737	1,886		4		14	18	2,090		3,994
South Carolina		31,612	5,669	2,642	4,100	44,023		36			36	5,141	60	49,260
South Dakota									200		200			200
Tennessee		20,000			13,000	33,000			400		400	75,886	16,888	126,174
Texas [6]			2,484		5,681	8,165	368		647		1,015	1,348	2,119	12,647
Utah									1,400		1,400		3,200	4,600
Vermont		100			1,944	2,044		50			50	62,415	13	64,522
Virginia		10,522	1,890		24,196	36,608			90	2	92	48,781	7,630	93,111
Washington			200		800	1,000			2,000		2,000	10,743		13,743
West Virginia		923	109		10,199	11,231			205		205	25,509	7,004	43,949
Wisconsin					5,285	5,285			317		317	8,934	6,591	21,127
Wyoming									1,500		1,500			1,500
Continental United States	684	240,915	73,816	4,209	479,005	798,629	2,243	198	49,885	976	53,302	728,320	113,633	1,693,884
Hawaii					4,600	4,600				100	100			4,700
Puerto Rico					1,000	1,000								1,000
Total, United States	684	240,915	73,816	4,209	484,605	804,229	2,243	198	49,885	1,076	53,402	728,320	113,633	1,699,584

[1] The commercial distribution of normal grades was estimated for Georgia, Maine, Oregon, Tennessee, Washington, Hawaii, and Puerto Rico. In a few other cases the figures are partly estimated.
[2] Nearly all 32 percent.
[3] Mostly 45 percent.
[4] Nearly all 20 percent.
[5] 44 or 45 percent in the Western States and 47 or 48 percent in the Eastern States.
[6] State fiscal year ended in 1941.
[7] Includes 16 tons of 24 percent grade.

TABLE 24.—*Weighted-average percentage of available phosphoric acid in commercially distributed normal superphosphate, by regions and certain States, 1926–41*

Region and State	1911	1921	1926	1931	1936	1938	1939	1940	1941
New England	15.14	16.71	17.00	17.10	18.02	19.18	19.15	19.73	20.08
Maine	[1] 14.91	[1] 16.80	17.12	17.79	19.03	19.27	19.17	19.07	19.15
New Hampshire	[1] 16.09	[1] 16.66	16.70	16.76	17.37	19.12	18.92	19.62	20.69
Vermont	15.20	16.76	17.87	17.53	18.19	19.93	20.68	20.30	21.60
Massachusetts	14.64	16.78	16.85	16.71	17.15	18.17	18.35	20.06	20.16
Rhode Island	[1] 13.70	[1] 15.93	16.80	17.08	17.72	19.54	19.14	19.35	20.18
Connecticut	[1] 15.72	[1] 16.57	16.40	16.64	17.98	19.16	19.21	19.17	19.43
Middle Atlantic	14.38	16.34	17.00	17.92	18.14	19.20	19.47	20.45	20.38
New York	[1] 14.17	[1] 16.19	16.83	18.44	18.88	19.40	19.57	21.03	20.42
New Jersey	[1] 14.40	[1] 15.80	16.64	17.34	17.56	18.37	19.04	18.88	19.06
Pennsylvania	14.27	16.37	17.07	17.81	18.05	19.41	19.41	20.11	20.62
Delaware	[1] 14.35	[1] 15.61	16.33	16.28	17.25	17.99	18.62	18.85	18.55
Maryland	[1] 14.87	16.32	16.68	17.00	17.31	17.54	18.64	19.42	20.34
West Virginia	[1] 15.50	[1] 17.45	17.84	18.53	17.98	18.60	19.98	19.21	19.55
South Atlantic	15.30	16.36	16.60	16.69	16.83	17.36	17.01	17.34	17.92
Virginia	[1] 15.27	[1] 15.89	16.57	16.61	16.78	17.69	17.59	18.00	19.24
North Carolina	[1] 14.87	16.47	16.02	16.20	16.25	16.66	16.55	16.73	16.70
South Carolina	[1] 15.18	[1] 16.47	17.20	17.34	17.18	17.32	16.82	17.26	17.21
Georgia	15.84	16.52	16.63	16.70	17.07	17.59	16.86	17.30	18.24
Florida	[1] 15.50	[1] 17.20	16.86	17.01	18.55	18.61	18.57	18.70	18.78
East North Central	14.01	16.91	18.93	19.46	19.92	20.11	20.40	20.49	20.51
Ohio	13.63	17.04	18.91	19.36	19.95	20.07	20.45	20.53	20.50
Indiana	14.30	16.75	18.94	19.18	19.74	19.79	19.88	20.20	20.50
Illinois	[1] 14.12	[1] 16.83	19.20	19.76	19.87	19.93	20.05	20.18	20.40
Michigan	[1] 17.05	17.25	18.95	19.66	19.90	20.33	20.70	20.75	20.55
Wisconsin	[1] 15.00	[1] 16.60	19.44	20.75	20.86	20.70	20.79	20.49	20.56
West North Central	14.65	16.88	17.64	18.61	19.61	19.98	20.31	20.30	20.69
Minnesota	[1] 14.72	[1] 16.77	16.80	17.14	18.27	18.62	19.65	19.50	19.80
Iowa	-------	[1] 16.98	18.30	18.45	20.50	20.60	20.90	20.70	20.70
Missouri	14.66	16.86	17.57	18.92	19.62	20.02	20.36	20.31	20.87
Kansas	[1] 14.50	16.97	18.06	18.62	19.40	19.87	19.79	20.30	19.79
Nebraska	-------	[1] 17.00	19.50	19.80	20.25	[1] 19.80	17.16	[1] 19.90	[1] 20.00
North Dakota	-------	[1] 17.00	19.20	19.40	20.00	[1] 20.00	21.00	[1] 20.00	[1] 20.00
South Central	15.67	16.50	16.95	17.56	18.06	18.00	18.11	18.54	18.63
Kentucky	[1] 13.86	[1] 16.56	17.46	19.27	20.39	20.55	20.54	20.68	20.14
Tennessee	[1] 15.70	[1] 16.50	16.55	16.67	16.87	17.27	17.43	[1] 17.50	[1] 17.70
Alabama	[1] 16.07	[1] 16.20	16.30	16.76	16.43	16.19	16.47	[1] 17.30	[1] 18.00
Mississippi	[1] 15.00	[1] 15.92	17.08	16.95	18.85	18.93	19.01	18.90	18.94
Arkansas	[1] 16.50	[1] 16.70	17.65	17.83	19.30	19.36	19.92	19.95	20.70
Louisiana	[1] 16.10	[1] 16.98	17.50	18.93	19.19	19.55	19.64	19.34	19.59
Oklahoma	[1] 15.75	[1] 17.10	18.48	19.78	19.81	20.18	20.58	20.26	20.01
Texas	[1] 15.75	17.11	18.18	19.07	19.50	19.46	19.32	20.46	20.00
Western	17.72	17.84	18.15	18.81	18.55	18.57	18.68	18.23	18.56
New Mexico	-------	-------	18.10	19.15	20.90	20.95	20.85	20.95	20.80
Arizona	-------	-------	-------	-------	-------	18.50	20.78	19.96	21.09
Washington	[1] 17.75	[1] 17.71	18.18	18.95	19.15	[1] 19.00	19.19	19.30	19.50
Oregon	[1] 17.20	[1] 17.14	18.16	19.50	19.20	18.97	18.78	19.09	20.02
California	[1] 17.84	18.10	18.15	18.27	17.98	18.32	18.38	17.95	17.91
Continental United States	15.08	16.53	17.25	17.59	18.04	18.53	18.67	19.09	19.28

[1] Partly estimated.